

JOURNAL

of the

American Veterinary Medical Association

FORMERLY
AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n)

EDITED AND PUBLISHED FOR
The American Veterinary Medical Association

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THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION is issued the first of each month. Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the tenth of the preceding month to insure insertion in the next month's issue. Volumes begin in April and October.

Communications relating to publication, subscriptions, advertisements and remittances should be addressed to JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, 1620 Hobart St., Washington, D. C. Matters pertaining to the American Veterinary Medical Association and membership should be sent to Dr. N. S. Mayo, Secretary, 4753 Ravenswood Avenue, Chicago, Illinois.

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The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. A circular of prices will be sent upon application.

VOL. LVIII, N. S. VOL. 11

NOVEMBER, 1920

No. 2

INTERNATIONAL CONGRESS ON FOOT-AND-MOUTH DISEASE

AN international congress on foot-and-mouth disease was called to be held at Buenos Aires, September 6 to 11, under the auspices of the Argentine Government. The congress was divided into three sections, scientific, sanitary, and economic.

According to the program the subjects for discussion in the scientific section included the susceptibility of various species of animals in different parts of the world to foot-and-mouth disease; the clinical study of the disease in the affected species; symptoms and lesions in mild, septicemic and abnormal forms; diagnosis in each country; the present state of research relative to the causative agent, whether a filterable virus or other microorganism; virulent materials; exaltation and attenuation of the virus, mode of penetration, and differences in severity in different epizootics; immunity following a first attack; cause of recurrence in the same animal within a year, as is frequently observed in Argentina; possibility of preventive inoculation; therapeutic and prophylactic treatment; transmission of the disease to man.

Subjects for the sanitary section were: The history of outbreaks in various countries; existing sanitary regulations, and reasons for the unsatisfactory results in most countries; veterinary sanitary organization in each country in South America, and mode of remedying insufficiency by the establishment of sanitary zones, laboratories, etc.; differential diagnosis of maladies likely to be confounded with foot-and-mouth disease; importance of immediate notification of the central authority when the infection appears; results obtained in the United States and England by the prompt slaughter of affected, exposed and suspected animals; results obtained by isolation of diseased and suspected animals; rigorous inspection of markets, fairs, expositions, etc.; spread of the disease by railway and other transportation; most efficacious modes of disinfection; international sanitary measures; necessity of general compulsory inspection of foods of animal origin; official control of products offered for sale for curative and preventive treatment; necessity of an organization in each country for applying sanitary police measures; interest of agricultural and stock-raisers' societies in the strict application of sanitary measures.

The economic section considered the losses caused by foot-and-mouth disease in different countries during the past century; morbidity and mortality in different species of animals; appearance of other diseases concomitantly with or immediately following foot-and-mouth disease; damage caused to breeding and fat stock; damage caused to milk production; economic advantages of slaughter with indemnity over isolation; economic history of epizootics in the United States and England where slaughter has been employed in preference to isolation; economic value of saving and treating valuable animals for breeding stock; resources for supporting sanitary police service; live-stock insurance.

In reviewing this formidable list of subjects we have reason to feel that the United States is fortunate in not having to deal with most of them at this time and that our effective methods of eradication in the past have spared us many of the problems and difficulties that now beset many other countries.

FOOT-AND-MOUTH DISEASE SEVERE IN EUROPE

FROM a recent Belgian official report we learn that the present epizootic of foot-and-mouth disease presents an exceptional gravity in the greater part of Europe, with an increased mortality among

young animals and frequently also among adult animals. The Government of the Netherlands, it is said, has had to abandon its system of combating the disease by slaughter and has officially adopted the general application of serum therapy. The operation consists in injecting the defibrinated blood of bovine animals that have recovered from the disease. The blood is drawn not less than 15 days nor more than a month and a half after recovery. The dose is 120 c.c. for adult cattle, 50 c.c. for calves and 10 to 30 c.c. for pigs. Vaccinated animals do not contract the disease as a rule, or, if they do, it is generally in a mild form, and the mortality is almost nothing. The immunity, however, is of short duration.

THE JOURNAL COSTS MORE

BEGINNING with the October number, the subscription rates for the JOURNAL have been increased by direction of the Executive Board. This action was made necessary by the greatly increased cost of everything that enters into the production of a magazine. The amount of the advance represents only a small part of the increased cost, which appears to be permanent. In deciding upon this step we have merely done, after considerable delay, what the publishers of most other magazines did some time ago.

The new subscription rates for non-members of the A. V. M. A. are \$4.00 instead of \$3.00 in the United States, \$4.25 instead of \$3.25 to Canada, \$5.00 instead of \$3.60 to other foreign countries, and 40 cents instead of 30 cents for single copies. The subscription price for Association members is included as heretofore in the amount of their dues, which remains unchanged; so the increase does not affect them. *

AS the political campaign warms up, it begins to appear that either a certain donkey or a certain elephant will be in great need of skilful veterinary attention early in November.

ALTHOUGH the United States Supreme Court has not yet passed on the subject, it is feared that the Eighteenth Amendment to the Constitution nullifies the passages in the Government books on diseases of horses and cattle in which the administration of such remedies as alcohol, whiskey and milk punch is advised.

THE RELATION OF THE AGRICULTURAL PRESS TO THE VETERINARIAN¹

By E. S. BAYARD

Editor of The National Stockman and Farmer, Pittsburgh, Pa.

AT your Philadelphia meeting your Association honored me by making me an honorary member. I have had no previous opportunity to express my appreciation of such a high compliment. I may say, however, that I didn't fully appreciate it until I perused the list of honorary members and found my name on a roster of distinguished men, where any man might take pride in being enrolled. I would not refer to this matter except that this is my first opportunity to express appreciation of your gracious act.

You are well aware that I can contribute nothing to the store of research and experience which you pile up at these meetings every year. I know it too. I have even tried once or twice, as a member of a committee of the Livestock Sanitary Association, to unload a few of my scientific ideas, but I do not recall that any of them ever saw the light. I have concluded, therefore, that I didn't know so much as I thought I did; that the committeemen realized it but were too kind-hearted to tell me. They were all veterinarians and humanitarians too I think now. This is one of the ways I found out, what the rest of you knew better than I, that I could not enlighten you in the science to which you are devoted.

If I have no ability to enlighten you, what excuse, then, have I for taking a place on your program? None at all. You **must** blame your Secretary. A friend of mine was eating an apple one day when somebody said to him, "Look out, Bill, there's a bug on your apple." "Well," said Bill, calmly munching away, "he's there at his own risk." I am here at your risk.

When I appeared before the Agricultural Committee of the House of Representatives to try to secure just salaries for veterinarians in Government service I could say a few words that your own members could not say without appearing to indulge in self-praise. I said them as best I could, paying due tribute to your profession, its present high standards, and also the attainments and character of its practitioners. May we not hope that for the sake of your friends, for the sake of your profession, and above all for the sake of the

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

world which is becoming more and more dependent on your profession for food and raiment, you will continue to maintain the standards you have set for yourselves and those who follow you? Maintain them not merely in education but in all things that tend to make your profession of greater service in this world—and yourselves more happily located in the next. This is not a wholly unselfish desire on the part of any man with vision reaching beyond the mere present in our livestock industry. It is for the sake of the animal industry of the Nation, for the sake of those who must be fed and clothed by it, that I express the hope that you will abate not one jot or tittle of your high educational and professional ideals. (Applause.)

Where does the agricultural press come in? It comes in right here. The agricultural press, if it supports your cause (which is likewise its cause), must see in your profession the same kind of high-grade men and men as well qualified as it demands in agricultural colleges and other institutions which it endeavors to promote. Let me ask you, where would this country have been with pee-wees or even mediocrity in the places held by Melvin, Mohler, Marshall, Wills, McNeill and others during the foot-and-mouth epidemic? What if these men had lacked vision and knowledge and guts? (Perhaps the term I should have used in this highly professional company is "intestinal investiture.") Or what if they had lacked ability to command the support of the press and of their chiefs in Nation and State?

Not so many years ago a man came in to consult me about the profession of veterinary medicine. He was much disturbed because the horse was going out of the cities and the poor "vet" would soon find his occupation gone. I showed him the constantly increasing numbers of people in towns and cities, the constantly decreasing numbers on farms, and I told him that he would live to see a cow worth more than any horse he had ever seen and a hog worth as much as the average horse of the United States. I told him that as the country grew older, as its soils and yards and barns became infested or infected through successive generations of animal production, there would be increasing need of the veterinary medical profession. I showed him the possibility of great losses through epizootics, and the relation of animal health to national wealth, to a sound, wholesome and adequate food supply, and to a prosperous animal industry. I didn't tell him then, for I didn't know it, that it would be a God's blessing to a lot of veterinarians if the

livery stable did wink out and they would get their offices into other places like other professional men, and have the same pride in their profession as other men have in theirs. (I hope I am not offending any of you gentlemen, but this is what I think.) All of these things have come to pass, and still the horse travels the streets and will continue to do so wherever he is cheaper than mechanical power—which is in quite a few lines of work.

As I have just intimated, the agricultural press is interested in you primarily because it is interested in the animal industry of this country. And the animal industry means more to us than a mere meat supply—it means the maintenance of the fertility of our soils, and that means a prosperous agriculture, an adequate national food supply, cereal and vegetable as well as animal. We are interested in you for business reasons, not merely on account of your personal charms. Farmers are going to demand more service of you in the future than in the past, and more of you are going to live in the country or country towns. A day of closer relations between farmers and veterinarians is coming. Look at the purebred livestock being put on farms; look at the value of all livestock; look at the steady advancement of agriculture and animal industry if you doubt it.

If this is true, here are a few things for you to remember. If your young men are to practice among farmers to their mutual benefit, they must strive to understand. Here the agricultural press may be of some service, in helping to an understanding. I'd like to preach a baccalaureate sermon to every graduating class of every college of veterinary medicine, and my text would be, "With all thy knowledge, get understanding." Our animals mean so much to us who have bred them for successive generations. Our faithful servants mean so much to us. We have on our farm a horse twenty-six years old. Thank God nobody has money enough to buy him! For whosoever could buy him could buy our gratitude, our affection, our self-respect! Such animals are more than mere cases to us—they represent years of thought, years of service, and we want them to mean something to you. I have mentioned this merely as an example of many similar relations. We should be real friends with a real interest each way, and not merely acquaintances, ye who practice in the country. I have heard some veterinarians make fun of their farmer patrons, and some farmers make fun of the veterinarians; but one friend is worth a dozen neutrals, to say nothing of enemies, and such things merely show a lack of understanding. Let me appeal to you leaders in your profession to teach under-

standing, for doubtless you do not need such exhortations yourselves.

I am aware that the agricultural press has been criticized by some veterinarians for two things, to which I refer briefly. First, for giving veterinary advice through its columns. I believe this is no longer condemned. At any rate it helps your profession instead of hurting it as some of you used to think. In our own case we have tried to make this department a work on animal husbandry rather than a prescription counter. Second, the advertisements of veterinary medicines carried by the press. I must here plead not guilty and shift the accusation. Some years ago I offered, twice, to submit all such advertising to the proper committee of this body, and received no answer to my proposition. Let me tell you another story. A few years ago in this city a man who wanted us to advertise a hog-cholera cure took me to his office to convince me that we should do it. And to convince me he showed me a stack of indorsements from veterinarians. But a trial by leaders in veterinary research, we buying the material and they furnishing the animals, showed that the remedy was no good. Here at least press and profession coöperated. And we can coöperate some more.

I must apologize for taking so much of your time on matters which some of you may consider of little importance. However you may regard them or us, we are beginning to understand you and your work better. We see, not thirty miles from here, cattle from former tick country on feed and more to come from all over the South. We see our herds being certified—and the press has held back a little for your sake on this. We see scab of sheep and cattle being controlled. We see hog cholera's annual ravages reduced and rapid progress toward its conquest. We see the old problem of abortion being tackled anew—and not despairingly. We see parasites, internal and external, of all kinds being brought under control. And finally we see trainloads of livestock moving to market without quarantines and not reduced by apthous fever! And in all of these and more we recognize the value of your profession and yourselves.

“Never has there been a greater campaign than the one which is now being launched by the United States Department of Agriculture in behalf of ‘Better Sires—Better Stock.’ The campaign will revolutionize the livestock industry of America if livestock owners will only coöperate with State and National Departments of Agriculture, as good business judgment requires they should.”—*Dairy Farmer*.

STRONGYLOSIS (OSTERTAGIA) IN CATTLE¹

By JAMES E. ACKERT and WILLIAM E. MULDOON, *Manhattan, Kans.*

OUR attention was recently attracted to a herd of unthrifty yearling steers, many of which were suffering from a severe attack of strongylosis, which was so acute that several of them died. The autopsies revealed heavy infestations of the encysted stomach-worm, *Ostertagia ostertagi*, which apparently was responsible for the loss of the stock.

Little of the history of these steers was obtainable, except that they had been summered in Missouri, purchased in the Kansas City Stockyards and shipped to the vicinity of Manhattan, Kans., during the month of January, 1920, all of them being in poor physical condition. Of the 84 steers purchased, about one-half became visibly affected; 12 were so diseased that they had to be segregated from the herd, and 9 died. A brief description of the clinical symptoms and of the post-mortem findings of one of these fatal cases was reported by Muldoon (1920, p. 89).

SYMPTOMS

All of the affected animals presented practically the same clinical picture, the most noticeable features being their extreme emaciation and anemia. There was marked pallor of the visible mucous membranes and skin, and some of the more severely affected animals had dropsical swellings in the submaxillary region (fig. 1) and along the brisket. The hair had an unthrifty aspect with an excess of dandruff, and the skin seemed to cling to the structures beneath. Subcutaneous fat was lacking, the eyeballs were sunken, and the branding marks, placed upon the animals some weeks previously, had not healed but had begun to ulcerate. Decubitus sores were present upon some of the animals which were down and unable to rise. The severe cases showed a profuse watery diarrhea, the stools being voided in a stream and containing small air bubbles. That the animals retained good appetites was evident from their feeding until death, one steer having died with his mouth full of food. The temperatures of the sick animals ranged from normal to 104°, while the respirations were slightly below normal and the pulse weak. As might be expected, thirst was increased in those cases suffering

¹ Contribution No. 28 from the Department of Zoology and from the Department of Medicine and Surgery, Agricultural Experiment Station of Kansas State Agricultural College.



Fig. 1. Steers affected with strongylosis, showing general emaciation and edema in the submaxillary region.

from marked diarrhea. The severely infested animals lived approximately a week after the profuse diarrhea began, when they became weaker, more emaciated and anemic, and finally died, apparently from exhaustion.

ANATOMICAL CHANGES

Each cadaver autopsied showed marked emaciation, anemia and hydremia. The mucosa of the abomasum was swollen, edematous, and raised in gelatinous folds. There were reddened spots here and there and the whole mucosa seemed beset with grayish white nodules (fig. 2) varying in size from a pinhead (*a*) to a pea (*b*). In many of the nodules could be seen a small opening through which the worm had passed. Many of the nodules were extremely superficial and could be readily ruptured under finger pressure. A number of erosions (*c*) from the size of a lentil to that of a finger nail were present throughout the mucosa and were due to the superficial sloughing of the nodule after the passage of the parasite into the alimentary tract.

PARASITES

The autopsy of one animal revealed a fluke, *Fasciola hepatica*, in the large bile duct of the liver. In another case a few lungworms,

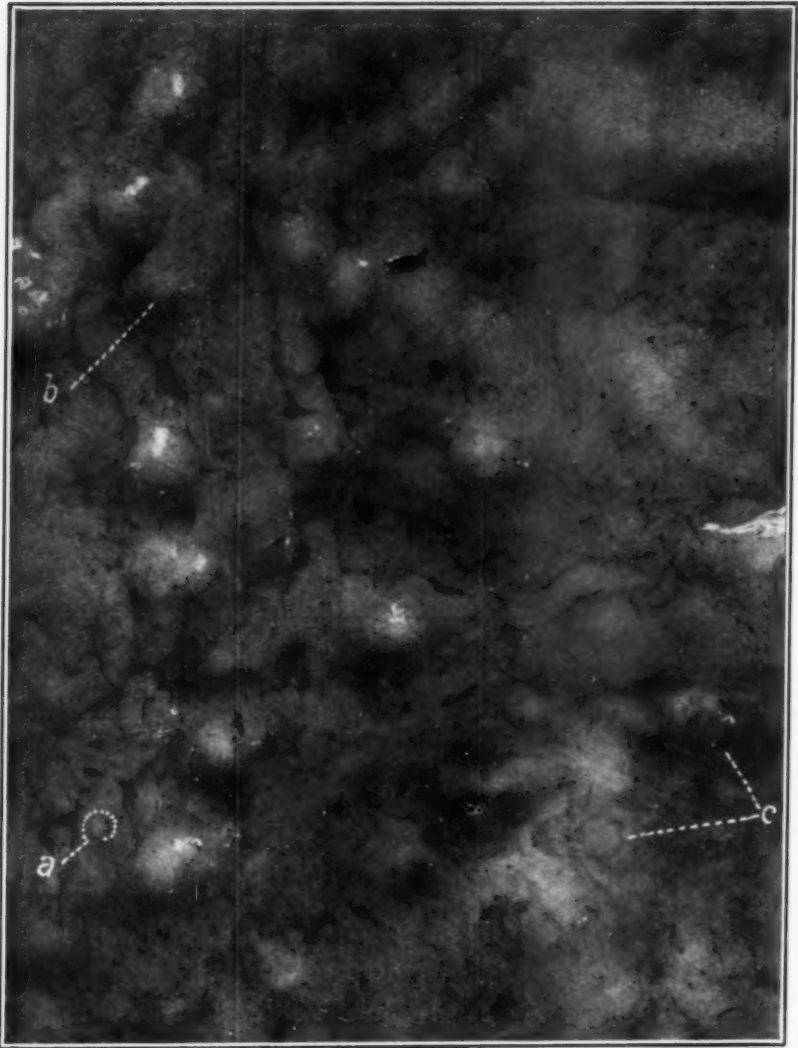


Fig. 2. Portion wall of abomasum of steer, showing nodules caused by *Ostertagia ostertagi*. A, beginning nodule. B, fully developed nodule. C, abandoned nodules showing eroded surfaces. (Slightly reduced. Photograph by F. E. Colburn.)

probably *Dictyocaulus viviparus*, were present. The small intestines of the two others contained a few hookworms and a small number of nematodes belonging to the genus *Cooperia*. But in the abomasum of every animal autopsied very large numbers of the trichostrongyle *Ostertagia ostertagi* were found, mostly free in the

lumen, but many slightly protruding through the nodules in the stomach walls.

DESCRIPTION OF OSTERTAGIA OSTERTAGI

These parasites are slender, hair-like nematodes, yellowish white in color. They range from about one-fourth to one-third of an inch in length, and occur in the abomasum, where they may be free or in the mucous membrane. As these nematodes are easily confused with other strongyles inhabiting the stomach and intestine of cattle, a rather full description of them is given.

The males (fig. 3, A) vary from 6.4 to 7.2 mm. in length. Their greatest thickness is just in front of the bursa, being 106 to 119

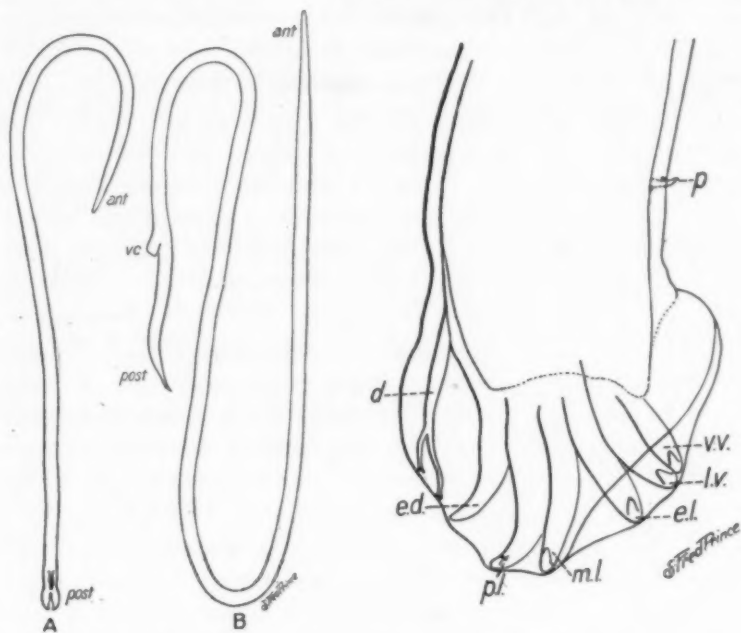


Fig. 3 (left). *Ostertagia ostertagi*. A, male; B, female; vc, cuticular cover of vulva. $\times 15$.

Fig. 4 (right). Bursa of male, dorsolateral view. d, Dorsal ray; e.d., externodorsal ray; e.l., externolateral ray; l.v., lateroventral ray; m.l., mediolateral ray; p., prebursal papilla; p.l., posterolateral ray; v.v., ventral ray. $\times 280$

microns. The head ranges from 14 to 21 microns in diameter. At the level of the nerve ring the diameter of the body is 47 microns and at the base of the esophagus it is 70 microns. The esophagus is 672 microns long and is encircled by a nerve ring 252 to 276 microns posterior to the mouth opening. At a distance of 311 to 315

microns from the anterior end is the excretory pore, which is 13 microns in front of the cervical papillæ. Beginning with a diameter of 15 to 17 microns, the esophagus gradually widens to from 42 to 50 microns at its posterior end. The rather small bursa with lobes outspread is about twice as wide as the greatest diameter of the body. The latter terminates abruptly between the wings of the bursa.

In the walls of the bursa (fig. 4) are a single dorsal ray and six pairs of rays. The paired ones are of nearly equal diameter, except the lateroventral one, which is somewhat thicker than the others. In each lobe the tips of the ventral and lateroventral rays lie close together, as do also those of the medio-lateral and posterolateral rays. The dorsal ray, approximately 56 microns long, divides in its distal half into two divergent branches which bifurcate just before they end. The length of the forked spicules is 213 microns, while that of the gubernaculum is 45 microns.

The females (fig. 3, *B*) are approximately 8.5 mm. long by 136 microns wide at the vulva. Diameters of different regions of the body are as follows: Head, 22 microns; at nerve ring, 56 microns; at base of esophagus, 70 microns; and at anus, 41 microns. As in the male, the esophagus gradually widens as it extends posteriorly, and is surrounded by a nerve ring at a point 262 microns from the oral opening. A prominent cuticular flap (fig. 5, *v. c.*) covers the transverse, slit-like vulva, which is slightly over 1 mm. from the posterior end of the body. The tail gradually tapers to a rounded tip which is 106 microns posterior to the anus. The muscular parts of the ovijectors form a cask-shaped structure 213 microns long by 73 microns in diameter at its maximum thickness. The oval,

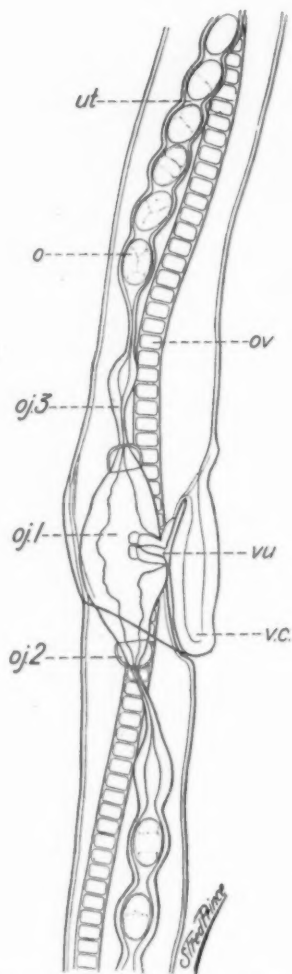


Fig. 5. *Ostertagia ostertagi*. Part of female body, viewed from right side. o, Ovum; ov, ovary; oj.1, oj.2, oj.3, portions of ovijector; ut, uterus; vc, cuticular flap covering vulva; vu, vulva. $\times 133 \frac{1}{3}$

thin-shelled eggs measure from 60 to 73 by 42 microns in diameter.

The size and structure of these nematodes make it evident that they are *Ostertagia ostertagi* (Stiles, 1892) Ransom, 1907, formerly known as *Strongylus ostertagi* Stiles, and as *Strongylus convolutus* Ostertag.

LIFE HISTORY OF PARASITE

The present writers made no attempt to incubate the eggs of *Ostertagia ostertagi* or to work out its life history, although segmentation had proceeded to the 4-cell stage in the uteri of the females under observation, and ejected eggs free in the normal saline solution had reached the 16-cell stage in 24 hours after their removal from the steer. Concerning this species, Stödter (1901, p. 52) states that in the uteri the eggs are usually in the 2 to 8-cell stage and only rarely are they sufficiently developed to show the outline of the embryo. According to this author the eggs after passing out with the feces develop rapidly in warm weather, forming complete, motile embryos in 12 to 24 hours. During the second day the embryos hatch and are very active in the surrounding medium (p. 56).

The free embryos range from 0.2 to 0.3 mm. in length, the anterior end being rounded and the posterior end pointed. Entering upon the larval stage, the young nematodes attain a length of 1.5 mm. In Stadelmann's opinion (1891, p. 37) the larvæ in this stage are taken in with the food, soon reaching the fourth stomach of the host. The parasite now bores into the mucous membrane, probably with the aid of two well-developed larval teeth, and assumes a spiral position close to the muscularis mucosa. An exudate with round-cell infiltration then appears, and the nodule formation begins. The developing nematode molts, passing into the second larval period. The reproductive organs begin forming and the digestive tract soon becomes plainly recognizable. The size of the larva is materially increased, as is also that of the surrounding nodule. After a second molt in the nodule the young parasites become sexually mature. In these swellings Stödter frequently observed larvæ, larval molts and sexually mature worms, but he never succeeded in finding ejected eggs or free embryos in them. Sooner or later the mature males and females pass into the lumen of the abomasum, abandoning the nodules, which begin to degenerate and to show the characteristic erosions (fig. 2, c).

The fecundity of these nematodes apparently is not marked, as there were but 9 to 11 ripe eggs in the uteri of the females studied

by the writers. This is in accord with the observations of Stadelmann (p. 37), who remarks that from the number of eggs produced in this species the fecundity in comparison to that of other nematodes is not great.

The length of life cycle probably depends upon the climate. At the latitude of Berlin, the observations of Stadelmann (p. 36) indicate that a life cycle of this parasite was completed in approximately four months. However, with the embryo hatching in two days under favorable conditions, it is probable that in warmer climates the length of life cycles does not require more than half of that time.

PATHOGENESIS

The nodules in the wall of the abomasum may be inhabited by a single larva, or as many as five, according to Stadelmann (p. 37), who also proved that these larvæ are blood-suckers, he having found their digestive tracts filled with blood corpuscles. This would disturb the nutrition of the host in a degree proportionate to the number of parasites present. Another and probably more detrimental factor than the loss of blood would be the absorption of the toxic metabolic products of the parasite. The erosions from the abandoned nodules and the attacks by the adult parasites on the mucosa afford opportunities for bacterial infection and other complications. The blood-sucking habit of these parasites accounts for the catarrhal condition of this portion of the digestive tract, the deleterious results of which are well known.

TREATMENT

In our cases, as in Stiles's, treatment was of no avail. It was practically impossible to check the severe diarrhea, and the animals grew weaker and became more emaciated rapidly. Astringents and intestinal sedatives in the form of tincture of opium, bismuth subnitrate, tannic acid, and oil of terobenthinæ, with large doses of linseed and mineral oil, were tried without result. Strychnine sulphate in medium-sized doses seemed to combat the extreme weakness but little. Law states that perhaps arsenious acid 1 dram, sulphate of iron 5 drams, powdered nux vomica 2 drams, powdered areca nut 2 ounces, and common salt 4 ounces, mixed and divided into 30 powders, and 1 powder administered daily, might be of service. Underhill (1920, p. 278) recommends 3 to 4 ounces of 1 per cent solution of copper sulphate in water for calves and 6 ounces for yearling cattle, mentioning the necessity of keeping the

bovines from drinking water during the day they are dosed. As the young *Ostertagia ostertagi* are protected in the nodules of the abomasum wall and leave it only when they are mature, it is obvious that treatments would have to be repeated to rid the hosts of these parasites.

Preventative treatment is probably more important, but specific directions on this line will have to be withheld until the behavior of the eggs and larvæ outside the body of the host is more completely known. In the meantime general prophylactic measures against nematodes should be employed, such as the ample provision of salt, which is thought to be destructive to embryos as they enter the stomach, and general cleanliness about the feed yard.

STRONGYLOSIS OUTBREAKS DUE TO OSTERTAGIA OSTERTAGI

This small nematode was first reported in Berlin by Ostertag (1890, p. 457), who, on examining the inflamed wall of the abomasum of a yearling steer, found it in the nodules. The ease of overlooking it is probably responsible for the few records of its occurrence in gastro-intestinal outbreaks.

Concerning a verminous outbreak among young cattle Stiles (1900, p. 361) states: "This parasite (*Ostertagia ostertagi*) was found in every calf, steer, and cow examined on postmortem during my second trip to Texas. Although the worm is small, I can not escape the conclusion that it was the chief factor in the disease found among the cattle."

Heavy infestations of *Ostertagia ostertagi* were mentioned by Moras (1907, p. 182) as the cause of a gastric enteritis of calves in Argentina in 1898. Gardener (1911, p. 493) reported outbreaks of parasitic gastritis in young cattle due to *O. ostertagi* in different localities in England in 1907 and 1909. A similar outbreak occurred in New Zealand, as reported by Gilruth (1900, p. 303), who described a parasitic gastritis in calves, due to a small species of nematodes which he thought to be *Strongylus cervicornis*, but which really was *O. ostertagi*, according to Ransom (1911, p. 56). So numerous were these nematodes in the abomasum that Gilruth after making a few counts estimated the presence of 40,000 of these parasites in a single calf. The present writers made no counts of the *O. ostertagi*, but the latter were exceedingly numerous on the abomasum wall and in the periphery of the ingesta. The only other record from the United States of an outbreak of strongylosis due to this parasite appears to be that of Stiles in Texas.

SUMMARY

1. An outbreak of strongylosis due to *Ostertagia ostertagi* occurred at Manhattan, Kans., U. S. A., in March, 1920.
2. Forty steers were visibly affected, 12 seriously, and 9 died.
3. The most obvious symptoms were extreme emaciation, anemia, and edema in the submaxillary region, and, in advanced cases, profuse diarrhea.
4. The parasites are small, yellowish-white, hair-like nematodes, about one-third of an inch in length.
5. They cause the formation of nodules on the abomasum walls in which they develop and which eventually result in erosions of the mucous membrane.
6. The life history is not completely known, but it is probable that infection is direct, the eggs or larvæ gaining entrance in food or water, or by the host licking itself.
7. The parasites are blood-suckers.
8. Treatment is difficult and uncertain.
9. All recorded outbreaks due to this parasite have been among calves or yearlings.
10. This report is the first record of such an outbreak in Kansas and the second in the United States.
11. Strongylosis outbreaks due to *Ostertagia ostertagi* have been reported from Germany, the United States, England, Argentina and New Zealand.

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ERADICATING TUBERCULOSIS IN PENNSYLVANIA¹

By SAMUEL E. BRUNER, *Harrisburg, Pa.*

IT was recognized in Pennsylvania as early as 1896 that, in order to check the spread of tuberculosis, it was necessary to have a definite plan of procedure. On February 19, 1896, the following plan was adopted by the Pennsylvania State Livestock Sanitary Board, now the Pennsylvania Bureau of Animal Industry, and it became known as the "The Pennsylvania Plan:"

"On application from the owners of tuberculous herds, the State Livestock Sanitary Board will furnish free inspection and tuberculin, on condition that the cattle owner will agree to (1) assist in the examination; (2) separate the tuberculous from the healthy cattle and have them cared for separately as directed by the State Livestock Sanitary Board; (3) disinfect stables and correct faulty sanitary conditions as directed by the State Livestock Sanitary Board; (4) Discontinue the use of milk and cream from infected cows, except when boiled or heated to 185° F. and kept at that temperature for seven minutes."

This plan, with the exception of a few slight alterations made to meet changing conditions of the times, was continued in operation for twenty-three years. The results were satisfactory and proved to herd owners that eradicating tuberculosis was practicable and economical.

The records show that under this plan 20,237 herds, comprising 276,895 cattle, were tested, of which 32,392, or 11.6 per cent reacted. During the first five years of the Board's existence—1898 to 1900, inclusive—17.3 per cent reacted, 60 per cent of the herds tested were infected, and 30 per cent of the reactors when slaughtered were tanked. During the last five years—1915 to 1919, inclusive—9.4 per cent reacted, 32 per cent of herds tested were infected, and 15 per cent of reactors were tanked. These facts indicate that tuberculosis has been reduced approximately 50 per cent in Pennsylvania since 1895.

The Pennsylvania plan was discontinued July 15, 1919. A large number of these herds are now working under the accredited plan. This accounts for what we consider the remarkable showing in Pennsylvania that has been made under the accredited plan. We have remaining about 350 herds in operation under the former

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

agreement. We recommend that they be placed under the accredited plan.

In the eradication, control and suppression of tuberculosis it is necessary to protect the healthy herds and remove the tuberculous animals from the infected herds in the shortest possible time. In order to accomplish these results the following policy is executed in the testing of herds that are under supervision in Pennsylvania:

1. Should the initial test reveal one or more reactors and the autopsy show slight lesions indicating that they are not spreaders, the following action will be taken: Ascertain history of herd, in particular if any animals have been sold, or have died, cause of such removals and changes. Should the report indicate that no changes in herd have been made, it is reasonable to assume that a spreader remains in the herd. The next test applied shall be the combination.
2. Should the initial or a subsequent test reveal 10 per cent or more reactors, the following action will be taken: Apply the combination test to the entire herd 60 to 90 days from date of last subcutaneous test. Animals under 6 months of age are to be given only intradermal and ophthalmic test.
3. In herds or parts of herds which the history and records indicate have been tested at regular or irregular intervals under the unofficial plan, and from which a number of tuberculous animals have been removed, the following action will be taken: Combination tests to be applied to entire herd; animals under 6 months of age to be given intradermal and ophthalmic; next test not to be applied within 9 months.
4. In herds credited with one or more negative tests, in which on subsequent tests one or more animals react, the following action will be taken: If autopsy reveals visible lesions, the combination test is to be applied to entire herd 6 months subsequent to date of last test. Animals under 6 months of age are to be given intradermal and ophthalmic test.
5. Retesting of suspects will be greatly reduced by the more liberal use of the combination tests. However, when it is required to retest suspects, use the combination test. This will, no doubt, assist in arriving at a more definite and satisfactory decision.
6. All combination tests should be applied in the following manner: Inject intradermal tuberculin in the left caudal fold. At this time instill in the left eye a 4 per cent ophthalmic solution or one ophthalmic disc. Make intradermal reading 48 and 72 hours after injection; on the third day make second reading. On this third day take the usual number of pre-injection temperatures for the subcutaneous test. Inject the tuberculin, using the prescribed dose. Should this test be a 60-day retest, inject double the amount of tuberculin given for the initial test. Following the subcutaneous injection, instill in the same eye that received the 4 per cent ophthal-

mic solution or one ophthalmic disc an 8 per cent solution or two ophthalmic discs. Resume the subcutaneous test. Take the first post-injection temperature at the third hour following the injection, the second at the sixth hour, and continue at regular two-hour intervals up to and including the twentieth hour. Following each temperature measurement, observe the eye. Observe the caudal fold again at the ninety-sixth hour. In interpreting the results, consider the animals that give a definite reaction to either the intradermal or subcutaneous as positive, but those that react only to the ophthalmic should not be classed as positive unless there is abundant purulent exudate.

7. In disposing of reactors, agents are instructed to give owners more assistance in obtaining actual market value from butchers.

8. Agents will impress upon owners the importance of having the stables thoroughly and promptly cleaned after removal of reactors, in order that the disinfectant can do his part and is not required to supervise the cleaning.

9. Continue the educational work.

Since the adoption of this policy it has been pointed out by work in Pennsylvania and elsewhere that the order of applying combination tests might be improved. If further work along this line confirms this belief the Pennsylvania policy in this respect will be amended.

By following this policy in the testing of herds we consider that rapid progress has been made in so far as eradicating the disease is concerned.

In reference to herds tested under the accredited plan, as the result of the first tests of 964 herds, 643 herds were credited with negative tests, and 321 herds were infected. In testing the 321 infected herds we were able to remove all tuberculous animals from the infected herds on the first test except from 42 herds, or 13 per cent of the 643 herds credited with one negative test, on a subsequent test tuberculous animals were removed from 18 herds, or 2 per cent.

Nine of the 254 accredited herds have been retested, and all have passed a clean test except one herd in which one animal was classed as a reactor by tester and held for a retest. This animal passed a successful intradermal test.

Unfortunately it is a national fad to chronicle all the "successes" and only occasionally call attention to the "failures." But for the latter there would be none of the former. We assume this may be one of the reasons that practically nothing has been written about the apparent present-day inefficiency of the tuberculin tests, in not being able to demonstrate the disease on autopsy and laboratory

examination, or better results in this respect have been obtained elsewhere.

As to what constitutes a reaction, as well as the efficiency of the tuberculin tests, Pennsylvania seemed to be in accord, up to 1915, inclusive, with recognized authorities such as Nocard, Eber, Ostertag, Bang, Hutyra and Marek, and others, also with the conclusions reached by the International Veterinary Congress held at Budapest.

In the disposal of reactors the records show the percentages of inefficiency or error to have been as follows:

Year.	Number of reactors.	Percentage of inefficiency.
1913.....	1,133	3
1915.....	701	3
1916.....	1,416	6
1917.....	1,750	6
1918.....	1,350	7
1919.....	1,723	11

During the 26 months of operation of the accredited plan in Pennsylvania in the disposal of 1,587 reactors (as shown in Table 1) we were unable to demonstrate the disease on autopsy or laboratory examination in 148 animals, which shows an inefficiency of 9 per cent. Had the reactions been interpreted according to the above-mentioned authorities and the instructions issued by the Federal Bureau of Animal Industry, we would have been justified in classifying 113 of the 148 animals as positive and the inefficiency would have been 7 per cent instead of 9 per cent.

By interpreting in the same manner the tests of another group of cattle (Table 2) we would have been justified in classifying 71 of the 118 animals as positive, and had this interpretation been made the inefficiency would have been 19 per cent instead of 29 per cent.

Tables 1 and 2 include 266 condemned cattle which on autopsy showed no visible lesions of tuberculosis. In the majority of cases specimens were submitted for laboratory examination. The latter included macroscopic and microscopic examination and guinea-pig test. In every instance the findings were negative. The 12 herds represented in Table 2 are owned by public institutions and are under the direct control of the Pennsylvania Bureau of Animal Industry in so far as transmissible diseases are concerned.

In testing today conditions are better than they were five years ago. In fact there is marked improvement each year. Practitioners and Federal and State employees are better qualified to conduct tests; more coöperation is received from the owner; sanitation is improved

TABLE 1.—*Results of Testing Herds under Accredited Plan, April, 1918, to June, 1920.*

Test	Herds	Cattle	Reacted		Autopsy				Tanked	
			Number	Per cent	Positive	Efficiency, Per cent	Negative	Inefficiency, Per cent	Number	Per cent
First....	964	16,693	1,532	9	1,285	91	114	8	191	13
Second...	473	8,306	218	2	133	84	25	16	10	6
Third....	78	1,801	33	1	20	71	8	29	2	7
Fourth...	5	193	1	0.5	0	0	1	100	0	0
Total...	.....	26,993	1,774	6	1,438	91	148	9	203	12

NOTE.—187 reactors have not been slaughtered.

TABLE 2.—*Results of Testing 12 Herds Owned by Public Institutions.*

Test	Herds	Cattle	Reacted		Autopsy			
			Number	Per cent	Positive	Efficiency Per cent	Negative	Inefficiency Per cent
First	12	1,220	161	13	71	80	14	20
Second	12	1,272	66	6	74	89	9	11
Third	12	1,334	107	7	79	87	12	13
Fourth	10	1,994	75	7	47	63	28	37
Fifth	9	1,051	51	4	16	31	35	69
Sixth	6	779	15	1	1	6	14	94
Sev'th	3	399	9	2	3	33	6	67
Total	12	7,049	504	7	291	71	118	29

NOTE.—81 reactors have not been slaughtered.

to a great extent; tuberculin is prepared in a uniform manner; autopsy reports, taking them as a whole, are more accurate.

With all this in favor of increased efficiency, the actual results show that our inefficiency is increasing to an alarming degree in reference to no-lesion cases. Our accuracy is practically 100 per cent in herds that are tested the first time, but in each succeeding test of these same herds our inefficiency increases. The inefficiency increases as the disease decreases.

A number of no-lesion cases can be charged to the following: (1) Conditions producing pus; (2) parasitic diseases; (3) acute unrecognizable diseases; (4) actinomycosis; (5) dietetic trouble;

(6) retention of milk, or inflammation of udder; (7) animals under milk test; (8) feeding and watering; (9) sudden changes in atmospheric temperature; (10) pregnancy; (11) dosage of tuberculin; (12) inaccurate thermometers; (13) inexperienced testers; (14) over-anxiety of owner and testers; (15) purpose of autopsy mainly to determine food value, rather than a scientific postmortem examination; (16) unusual stabling conditions.

These causes or conditions do not, in our opinion, account by any means for all of our no-lesion cases. We believe that some animals that are not tuberculous are susceptible to tuberculin and at times give typical reactions and that some animals run erratic temperatures normally.

Time does not permit us to discuss each individual lot of cattle in the two groups represented in the tables. However, we want to call attention in passing to several facts.

The 12 lots in Table 2 may be, in a number of ways, considered our experimental herds. Three lots of this group were reinfected by added animals. In another lot of this group the Bang method proved a failure to a certain extent. Seven of the 32 animals slaughtered showed no lesions, indicating that on the initial test severe judgment was used. Yet on the second and third test 20 animals were removed from the free herd. This, no doubt, was due to poor coöperation at that institution. Bang herds were maintained in connection with two other lots; excellent coöperation was given and the results were quite satisfactory.

We believe that a number of animals in two herds in Table 1 showed erratic normal temperatures. In one of these herds in the test of 1919 a large number of the young cattle gave typical reactions or a very high temperature at the sixth or eighth hour after injection. All were retested in six months with negative results. In the last test indicated, in which 5 animals reacted, they were given a careful autopsy and on postmortem showed no visible lesions. Specimens were submitted to the laboratory with the same results. All of these animals were raised under the Bang method, and postmortem examination was made on all animals from this herd that were slaughtered for beef or other purposes and in no case was tuberculosis found.

Another herd in Table 1 had a number of animals that showed high post-injection temperatures and in which we were unable to demonstrate the disease on autopsy or by laboratory examination.

In the last test of 146 animals 6 gave rather high pre-injection temperatures. They were retested and passed a satisfactory test.

Of the 266 animals in both groups which were classed as reactors and in which we were unable to demonstrate the disease, 35 gave late reactions and 21 others gave early reactions, which confirms our belief that we must be rather cautious in condemning animals which give either an early or a late reaction.

Sixty of the 85 lots in Table 1 were from herds in a section of the State in which only 2 per cent of the animals tested reacted. This again shows that most of our no-lesion cases come from herds in which we have very little disease.

One hundred twenty-nine, or 47 per cent of the 266 animals indicated in the tables had post-injection temperatures of 104.5° F. or less, showing that we should use care in considering animals positive with temperatures of 104.5° F. or less. Of these 266 animals 16 gave post-injection temperature measurements less than 103° F., 66 gave post-injection temperatures between 103 and 104° F., 104 gave post-injection temperatures between 104 and 105° F., and 80 gave post-injection temperatures above 105° F.

CONCLUSIONS

1. A definite plan for suppressing, controlling or eradicating tuberculosis is indispensable. While the officially accredited-herd plan, as now drawn, can be improved upon in some respects, yet it is recognized as the best plan so far advanced for dealing with the proposition on a nation-wide basis.

2. A definite method for applying the different tests has worked well in Pennsylvania, as it acts as an excellent guide for the field men.

3. After seven years' trial we have proved beyond a doubt in dealing with most of the infected herds that in order to free them from tuberculosis the combination tests must be used.

4. As the disease decreases the inefficiency of the tests increases, in so far as not being able to demonstrate the disease on autopsy or laboratory examination.

5. Idiosyncrasies of certain persons or animals to certain drugs may possibly apply to the use of tuberculin on healthy animals, thus obtaining a false reaction.

6. We hope to profit by our mistakes and reduce our no-lesion cases by at least 50 per cent and at the same time free the diseased herds as we have and are doing at the present time—

(a) By taking a complete history of the herd into consideration before classifying animals as tuberculous, even though their temperature measurements indicate a reaction, a swelling of the caudal fold, or purulent exudate in the eye.

(b) The field men will submit reports with as much history as they are able to obtain. With their opinion, final judgment will be passed at the central office instead of in the field as at present.

(c) We have found an excellent method where we have a number of animals as the result of a test what we can not properly classify—to slaughter first those which give the strongest reactions and which we have some reason to believe are tuberculous, and to continue slaughter of animals as long as we can demonstrate the disease, or to slaughter one or more to determine definitely the disposition of others.

7. After all, the proper application and interpretation of the different tests can only be accomplished by those who regard and treat the tests as a delicate major operation.

A glaring instance of the dangers of marketing milk from untested tuberculous cows was recently reported to the Bureau of Animal Industry by one of its field men engaged in tuberculosis-eradication work. At the request of the city meat inspector of New Haven, Conn., the Federal inspector examined the carcass of a cow recently killed at a local slaughterhouse. The animal showed extensive lesions of tuberculosis in the lungs, liver and other parts of the body. Investigation revealed that the cow had been sent to the city by a dairyman who was delivering the milk from his herd to an orphan asylum of the city, and also that the milk was not pasteurized. Upon further investigation, in which the State authorities at Hartford coöperated, a test of the entire herd was made. Of a total of 25 cattle, 23 reacted to the tuberculin test.

“Some one has recently stated with wisdom that 2,000,000 cows that should be eliminated are being milked in the United States. We heartily agree with this statement and add that the method of locating these cows should be the tuberculin test. Thus far the accredited-herd system has proved to be the method most acceptable to dairymen and livestock breeders. It has now reached the point of ‘First come, first served.’”—*The Dairy Farmer*.

DISPOSITION OF TUBERCULOUS CATTLE¹

By O. H. ELIASON, *State Veterinarian of Wisconsin*

THIS may not be a very scientific topic, but it is one which must be given more attention by State and Federal veterinarians if they want to succeed in tuberculosis eradication.

A survey of the methods used in the various States reveals a motley array, but variety is not the worst part of it. *No practical or scientific method is in use at the present time.* The reason for this is no doubt because sanitarians have busied themselves in furthering the testing rather than in giving their attention to the subject under discussion.

Dr. Bang, of Denmark, seems to be the outstanding figure in this work. His success, however, was largely made possible by the small size of his country.

Whether the slaughter method should be adopted or not depends upon the prevalence of the disease in the territory within which the work is being carried on. This may vary in different States or in different parts of the same State. It may also vary in individual herds. When 50 per cent of a herd reacts to the test, it is questionable if the balance is worth saving. If a lesser percentage appears, the reactors should be removed and consistent eradication work started. Our experience in Wisconsin has been that privately-owned segregation herds, as a rule, are not a success; but credit must be given those few owners who had courage and perseverance enough to manage it right, and what is more, made it pay. In other words, they made the tuberculous herd replace itself with progeny which stood the test of time.

What to do with a reactor depends upon its quality. Unless the owner can safely segregate the animal himself, the reactor should be taken over by the State. The State should be equipped to utilize it in a manner which will most conserve its usefulness. Few people are able to segregate properly on one farm.

In order to treat this subject comprehensively it will be necessary to touch on the question of indemnity. Some will contend that the latter is not essential in this program. Perhaps it is not, but as the majority of States proceed with the slaughter and indemnity, it is necessary to supply the best means for that purpose.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

In the early attempts at tuberculosis eradication in this country, reacting cattle were killed, autopsied and buried, and I am ashamed to say that such practice is still to be found in this supposedly enlightened country. Only about 20 per cent of the reactors when slaughtered are condemned as unfit for food, and even a tanked animal is now worth from \$20 to \$30; therefore salvage becomes a matter worthy of consideration.

Wisconsin has tried several methods on which to base the payment of indemnity, which, briefly stated, are as follows:

During the biennium 1915-16 the maximum appraised value was \$70. The owner received one-half of the appraised value for a tanked carcass, three-fourths of the appraised value when lesions were found and the carcass passed for food, and full appraised value when no lesions were found. The cattle were shipped directly to some packing house and the proceeds deposited in the State treasury. (Let me say in passing that there should be nothing further paid for a tanked animal other than tankage price. Such an animal is of no value to the owner or to the commonwealth.)

In 1917 the maximum appraised value was raised to \$200 and one-half of the appraised value allowed in all events. The legislature also instructed the department to dispose of reactors by the most advantageous method.

The disposal of reactors had always been a source of considerable worry to the department. Sometimes they were sold after slaughter; at other times according to live weight; but there was always the feeling that we did not know whether we were being imposed upon or not, and there was always room for an argument on that point. Not all of this should be regarded as the fault of the packer. The indiscriminate shipping of these cattle directly to a packing house is an unbusinesslike procedure. Many of the animals were temporarily unfit for food, some being close-up springers; others had just calved or were suffering from the after effects. It was a common sight during certain seasons to find the slaughter floor littered with unborn calves. At other times of the year the shipments would reach the plant in lots ranging from one upward. The slaughter of a few reactors now and then on a killing floor occasions considerable extra labor, due to the necessity of cleaning and disinfecting afterwards. If these cattle could be delivered exclusively in large numbers the slaughter could continue until the shipment was done.

In May, 1918, with the pressing necessity for war economy, it occurred to me that a large part of this material could be salvaged under other conditions.

An abandoned farm consisting of about a section of land, well isolated, having a large pasture area and considerable usable buildings, was rented. The fences were not as good as desired, but that was overcome by maintaining a daily patrol. This place was equipped like any regulation farm, with milking machine, boiler, horses and tractor. Hay land and two large silos supplied feed for the winter. There being a demand for large quantities of condensed milk during the war, an outlet was readily found for the milk. Under normal conditions condenseries would refuse to take it, for fear of malicious detrimental advertisement. The condensing process naturally sterilizes the product, but their wares being widely distributed, one statement in a newspaper, when probably only half the truth is told, might no doubt injure their trade. It is too bad, but it is only one of the times when public opinion stands in its own light.

The receipts from the sale of milk for nine months was \$9,471.12. This helped considerably to reduce the overhead expense. Only the physically fit cows were milked. The unfit were kept in the open sheds. The sale of veal calves amounted to \$965.15. After an impartial inventory, giving due credit to depreciation, the average cost of handling each reactor through this farm was 19 cents. Some of the 3,315 head of cattle received at this farm remained there only a few days. Apparently healthy milch cows were sometimes kept for quite a period. All were sold by live weight according to current prices for their class and were weighed at the station *before being loaded on the cars*. Those of you who are familiar with the process of marketing cattle will appreciate that there is a 75 to 200-pound shrinkage on an animal after a 24-hour shipment, and that alone may constitute an item of \$5. Those of us who saw these cattle sold and also those of previous years feel that there was at least one cent difference in the sale price. That makes a difference of \$10 on a 1,000-pound animal. Tabulations show an average net saving of \$9 a head.

During 1917-18 the average salvage was \$35.32, and during 1918-19, the time during which the segregation farm was maintained, the average salvage was \$47.93. Due consideration was given to the difference in market prices prevailing during the two periods

and allowances made. The segregation farm was abandoned July 1, 1919, and our records from that time to July 1, 1920, show an average net salvage of \$41.02, or \$6.91 less than during the previous years when the retention farm was in operation. No attempt was made to salvage calves for other purposes than veal. A number of valuable calves were dropped on the farm, but since proper facilities for their care were lacking, they were disposed of for veal.

Naturally, the question is asked, "Why was this project laid down?" The answer is this: During the period when the farm was in operation the cattle owner had no further interest in the cattle after they were appraised and delivered at the station. After that they were State property. It did not matter to the owner what became of them, because he received one-half of the appraised value regardless of whether the animals died in transit or on the farm or were condemned on the killing floor. In order to conduct a concentration farm the cattle *must belong to the State* without any reservation. Occasionally an animal was injured and had to be destroyed, and in that case there was no salvage.

The cattle on this farm were sold collectively and not as individuals. In this way some good animals would help to sell the more inferior. Consequently if these belonged to different owners, or if the owners had any interest in the amount of salvage received for his animals, a concentration farm such as this would be an impossibility.

With the accredited-herd project came the coöperative payment of indemnity. The Federal plan opens the question of salvage to the owners. After careful consideration it was decided to discontinue the concentration farm, at least for the present. Furthermore, this was rented property and improvements which were necessary could not be made. Meanwhile the urgent need for its maintenance had ceased to exist, as the war had closed.

This project has wonderful possibilities in the hands of men who are willing to work for its success. The salvage of purebred calves has an unlimited scope.

Should this be undertaken as a permanent State project—and I think it ought to be—it should consist of, first, a concentration farm connected by a private switch and unloading yards, to which all reactors should be shipped. Valuable purebreds should be conspicuously marked and their history sent to the farm manager. Val-

uable females should be sent to a second farm where they would receive better care and where they could be watched until parturition took place. In some instances the animal should be kept as long as it bred regularly. Calves should be sent to a third farm where no tuberculous cattle were harbored, and should stay there until tested and passed by two tuberculin tests. It is to be hoped that at some time, not too far distant, the Federal law will be so amended as to permit of this plan.

At the present time Wisconsin pays on the coöperative basis, one-fourth of the difference between the appraised value and the amount received as salvage, or a maximum of \$20 in the case of grades or \$45 for registered cattle. In herds not under the coöperative arrangement, such as those in our county eradication plan, or herds under the supervision of the local veterinarian, the State pays an amount equal to that paid jointly on the coöperative project. All owners receive the same proportionate indemnity in our State. Each owner agrees, however, before indemnity is paid, to continue testing and not to expose his herd unnecessarily.

It is my conviction that the majority of the cattle owners of Wisconsin are ready to attack this disease. There must be no over-zealous enthusiasm injected which will overfeed the machinery. The people must be convinced that they are receiving value for their labor.

It is not the extensively diseased animal that the owner questions whether you were right in condemning, but it is the "casual" or the "suspect"—the animals which show only very small lesions, and often none at all, that it is difficult for him to see. The concentration camp is the place for such animals. Here they may at least redeem part of the cost by helping to produce, and the public will be protected.

While I was instrumental in originating the concentration farm, I take pleasure in crediting the success of the enterprise to the untiring efforts of Dr. J. P. West, to whom the responsibility of conducting the farm was detailed.

Tuberculosis among dairy cattle in Ohio has been reduced from about 20 to 5 per cent during the last 5 years, according to estimates of the State Veterinarian. There are now 2,000 herds under supervision, 500 herds have passed one test and 110 herds are fully accredited.—*National Stockman and Farmer*.

THE PREPARATION OF TUBERCULINS FOR THE DIAGNOSIS OF TUBERCULOSIS IN ANIMALS¹

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THERE has been a great amount of discussion of recent years on the subject of tuberculin, the method of its preparation, its potency and variability, its proper dosage, the many forms in which it is placed on the market, and the results obtained from its practical application in the field. The purpose of this paper is to call attention to the importance of the adoption of uniform methods for the preparation of this product.

It has not been long since many of the States had methods practically their own for tuberculin testing of cattle. Some of the differences were of only minor importance, but in other instances one State would not recognize a test that was satisfactory to another. The accredited-herd plan for eradicating tuberculosis provides that tuberculin prepared by the Federal Bureau of Animal Industry must be used. This ruling was a step forward in the use of a standard tuberculin.

If one should compare in detail the methods of producing tuberculin by various laboratories only a few instances would be found where the methods are identical, all of them being modifications of Koch's original method. These differences are often sufficient to cause considerable variance in the potency of the product, and on this basis tuberculins can well be grouped into three classes, namely: impotent, potent and superpotent.

Probably all laboratories engaged in the preparation of tuberculin, and particularly those operating under a Federal license, are putting out a potent or superpotent product. Undoubtedly all tuberculins would come in the potent class if the dose were properly regulated for each product. There should be a standardized product for which the proper dosage has been ascertained. Until such a product is available tuberculins uniform in potency can not be obtained. Possibly the various lots of tuberculin prepared in the same laboratory with exactly the same conditions for each individual lot will run more or less uniform, and such a product could be well used as a standard for gauging the potency of other tuberculins.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

Under the officially accredited plan the necessity of a uniform tuberculin has already been demonstrated. If this is true for accredited herd testing, then it is equally important that we have a uniform product for an accurate test under any other plan as well as for interstate testing.

In the past 2 to 4 c.c. of tuberculin solution has been recognized as the dose for an average-sized cow. This solution contained varying quantities of the concentrated tuberculin as prepared after the Koch method or modifications of it. There being a variation in the potency of tuberculins prepared by various modifications of Koch's method, there should also be a variation in the dosage of such tuberculins. There are variations in the sensitiveness of tuberculous animals to tuberculins, that is, one tuberculous animal may show a typical reaction when inoculated with a certain tuberculin while another animal of the same size may require a much larger dose. It has been proven that nonaffected animals can withstand comparatively large doses with no serious harmful after-effects and at the same time show no temperature reactions. The dose should be regulated large enough to detect affected animals that are not very sensitive. The dose of a certain tuberculin can only be determined by knowledge of its potency. An animal that would require 4 or 5 c.c. of a potent tuberculin to cause the typical reaction would require possibly only 2 or 3 c.c. of a superpotent tuberculin, while on the other hand 8 to 10 c.c. of a tuberculin low in potency would be required.

During the past two years our Bureau has noted some observations with reference to the preparation of tuberculins. The object was to determine if possible the influence of certain changes of technic upon the potency of the product. Various tuberculins are prepared from concentrated or old tuberculin, and it is in this product that our interests have been mainly centered. We shall therefore attempt to discuss briefly the various steps in its preparation and at the same time cite our observations pertaining to each.

CULTURE MEDIA

For a number of years fresh veal was used for the preparation of broth for the growth of the tubercle bacilli, and it was not until after the World War was well on its way and materials in general difficult to obtain that we learned that lean beef was just as satisfactory as veal. A comparative potency test applied to the two products showed beef bouillon tuberculin to be equally as potent as that

prepared from veal. We have found that the growth is apparently as luxuriant on 5 as on 7 per cent glycerin broth, but bouillon containing only 3 per cent glycerin did not grow as well. There was no difference in the amount of growth when acid potassium or acid sodium phosphate was substituted for sodium chloride. We believe that the proper reactions of the culture media and the proper incubator temperature are two very important factors.

TYPES OF TUBERCLE BACILLI

It seems to be well known that tubercle bacilli of either bovine or human type are suitable for producing tuberculin to be used in testing cattle. It has been our custom to use both types, and comparative guinea-pig tests showed neither one to be superior.

GROWTH OF CULTURES

There is a variation in the different laboratories of the length of time that cultures are grown. Most laboratories, however, grow them 8 weeks or longer. By application of the guinea-pig test we have observed that in cultures older than 8 weeks and up to 12 weeks, which is as far as our observations have gone, proper allowance being made for loss by evaporation, there is very little, if any, difference in the potency of the final product; but in 4 weeks cultures, though the growth may be apparently very heavy and well wrinkled, the product is usually impotent.

KILLING OF CULTURES

It is generally believed that tuberculin is quite resistant to heat. In our experiments tuberculin heated for 1 hour in the autoclave under 15 pounds pressure was not as potent as when the same lot was heated at 100° C. for 3 hours in the Arnold steam sterilizer. Experiments were then carried out to determine if the unheated was more potent than that obtained after heating at 100° C. In most instances the latter was found to be the more potent of the two. This can be accounted for by the maceration and extraction brought about by the heating process.

CONCENTRATION

After the cultures are killed the extract is concentrated to one-tenth its volume and the product is termed "old tuberculin." Some laboratories concentrate only sufficiently to allow for the addition of a preservative. The strength of the tuberculin, whether concentrated to one-tenth its original volume or only sufficiently to add

the preservative, will depend upon when the liquid is measured, whether before or after the growth has been removed.

Dr. M. Dorset¹ states that "it should be emphasized that the veterinarian who is making tuberculin tests should think, when he is determining dosage, in terms of 'old tuberculin' and not in cubic centimeters of the product he happens to be using." We believe he would be better able to calculate his dosage by keeping old tuberculin in mind if all old tuberculin was nearly the same strength, which would be the case if the methods of preparation were uniform.

Many claim that tuberculin kept in the concentrated form is more stable than when stored in the diluted form. While we believe this is true, we have tested tuberculins of various ages that were kept in the diluted form and found that these products remained potent for considerable time. Two years seemed to have practically no effect upon the potency. Tuberculins that had been kept five to six years in the diluted form were found to be still potent. In one case we tested some tuberculin which was prepared in 1896 against some prepared in the same laboratory in 1920. The 1920 tuberculin killed 100 per cent of the infected guinea-pigs in the dose of 1 c.c. per 500 grams weight, while that made in 1896 failed to kill any in four times that dose.

MIXTURES

To overcome any variances in individual lots as they are produced, we make mixtures of several lots, and feel that by so doing our product will be more uniform. Each mixture is submitted to a guinea-pig test.

BERKEFELD FILTERING

It has been our practice to filter our tuberculin through a Berkefeld filter, after it has been rediluted and the preservative added, and inasmuch as filtering does not alter the potency, it seems that this procedure should be practiced.

PRESERVATIVES

Carbolic acid is the preservative most commonly used for preserving tuberculin, and within certain limits the percentage seems to play no important part. We have tested tuberculin containing graduated amounts of carbolic, ranging from none to 1½ per cent, and our readings show that there was practically no difference in potency. Many laboratories dilute their crude tuberculin with 0.5 per cent carbol saline, thereby making it less than 0.5 per cent car-

¹ M. Dorset. Paper presented to the Tuberculosis Eradication Conference of State and Federal Livestock Sanitary Officials held in Chicago, October 6 to 8, 1919.

bolic. It has been our practice to dilute the crude tuberculin with 1 per cent carbol saline, using 1 part of tuberculin and 7 of saline, thus making the final product about 0.85 per cent carbolic. This insures a more sterile product and at the same time does not influence the potency.

GUINEA-PIG TEST

A modification of Koch's method of testing tuberculin on tuberculous guinea-pigs has for several years been used by the Federal Bureau of Animal Industry and has been fully described by Schroeder and Brett.¹ Our method differs from their in the number of guinea-pigs employed for testing each sample and the dosage. For each lot 12 affected pigs are used; 3 receive 4 c.c., 3 receive 3 c.c., 3 receive 2 c.c., and 3 receive 1 c.c., for 500 grams body weight. This test has proven a valuable method for comparing the potency of tuberculins, and we believe that all tuberculins should be subjected to it. It is doubtful if by this method the proper dose for a cow can be ascertained until a standard tuberculin is obtained, the dose of which is known. At present we have been using Government tuberculin as our standard.

In concluding we wish to emphasize the necessity of uniform methods of producing tuberculin, as we believe that if all laboratories prepared their bouillon the same, used the same type if not the same strain of tubercle bacilli, the same proportions of surface growth, etc., and subjected the product to the guinea-pig test, this product would be of a more uniform potency. Furthermore, the dose of tuberculin in general could be more readily ascertained.

"Federal and State veterinarians, working in Oklahoma, tested for tuberculosis in July 110 herds containing 1,821 cattle and found only 29 head affected with the disease, or only 16 per 1,000, while the average rate of all herds tested in that month was 39 per 1,000. These figures confirm the hope that careful and prompt work will eradicate tuberculosis from all cattle in Oklahoma without great expense."—*Oklahoma Farmer*.

Hoard's Dairyman says editorially in a review of the tick eradication and tuberculosis eradication work of the various States and Federal Government: "We are moving forward but we must expect resistance and prejudices to follow new ideas or when an attempt is made to improve live stock conditions."

¹ E. C. Schroeder and G. W. Brett. *Journal of the American Veterinary Medical Association*, Vol. 7, No. 4, p. 357.

COMBINATION TUBERCULIN TESTS¹

By HENRY W. TURNER, *Harrisburg, Pa.*

THE Pennsylvania Bureau of Animal Industry has always recognized the subcutaneous tuberculin test as its official test, and has constantly endeavored to perfect the technique and safeguard the interpretations.

When in 1907 Vallée demonstrated the possibilities of the ophthalmic test, and the same year projected the intradermal test, which was afterwards perfected by Moussu and Mantoux, Pennsylvania was early to try out these tests experimentally. After a number of experiments to determine the preparation, dose and dilution of tuberculin to use, as well as the method of application, it was decided in 1909 to try these tests as a check, or in combination with the subcutaneous.

Our Bureau in 1912 applied the ophthalmic tuberculin test in combination with the subcutaneous in the following manner: First, the subcutaneous test was applied and three days later the eyes were sensitized by the instillation of 2 drops of a 4 per cent solution of powdered tuberculin; four days after this sensitization a second instillation of an 8 per cent solution was applied. The tuberculin used was an aqueous solution of an alcoholic precipitated tuberculin in 4 and 8 per cent dilutions. For this test there were 69 animals presented, 39 of which reacted to the subcutaneous test, while but 31 reacted to the ophthalmic. All of the reacting animals showed lesions except 3 which were reactors to the subcutaneous test only.

From the satisfactory results obtained with the subcutaneous and ophthalmic tests combined our Bureau next decided to try a combination of the three tests—intradermal, subcutaneous and ophthalmic—in the order named. The herd selected (November 28, 1913) was composed of 20 grade animals, 18 of which were aged. There were no records of any previous tuberculin tests on this herd. The results of these tests are shown in Table 1. In this table we show 20 animals, the results being clear and decisive. In applying the tests in this order we observed the intradermal had a modifying effect on the subcutaneous test, but the efficiency of the ophthalmic test seemed to have been increased by the previous intradermal and subcutaneous injections.

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

TABLE 1.—*Results of Intradermal, Subcutaneous and Ophthalmic Tests Combined.*—Number Tested 20.

TEST	DATE	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
					LESIONS	NO LESIONS
Intradermal..	1913 Nov. 26	6	0	14	18	0
Subcutaneous	Nov. 28	5	4	11	18	0
Ophthalmic..	Nov. 30 Dec. 4	2	0	18	18	0

With these facts before us it was decided to conduct experiments to determine what effect or inhibitive action one test had upon another. For this work we used the tuberculous herd of 24 animals at our Bureau's experimental farm. All of these animals had at some time reacted to the subcutaneous tuberculin test, and all had been subjected to a previous test within six months. They were divided into 4 groups of 6 animals each. The order in which the tests were applied and the results are shown in Table 2.

Tests 1 and 2 were a combination of the intradermal and subcutaneous tests simultaneously. Group 1 received only intradermal tuberculin, and was used as a control, all 6 animals reacting. Group 2 received intradermal and 5 c.c. of subcutaneous tuberculin. Group 3 received intradermal and 15 c.c. of subcutaneous tuberculin. Group 4 received intradermal and 20 c.c. of subcutaneous tuberculin. Of the 18 animals in Groups 2, 3 and 4, only 2 reacted to the intradermal and 12 to the subcutaneous test.

The third test was an intradermal retest. This was made on the four groups 9 days after the first test, with these results: Five reacted in the first group, 1 in the second group, 3 in the third group, and 1 in the fourth group.

The fourth test, an ophthalmic, applied 7 days subsequent to the intradermal retest, resulted in 20 of the 24 animals reacting.

The fifth test, a subcutaneous, was applied 10 weeks after the first test, the dosage of tuberculin being the same as used in the original subcutaneous test; 22 animals were tested; only 6 reacted.

The sixth was an intradermal, applied 3 months subsequently to the second subcutaneous test; 19 of the 24 animals reacted.

The seventh and last test, an ophthalmic, was applied 3 months

TABLE 2.—*A series of Tuberculin Tests, Intradermal, Subcutaneous and Ophthalmic, 1913-14.*

Group	Animal No.	Test No. 1, first intra- dermal, Oct. 7, 8, 9	Test No. 2, first sub- cutaneous, Oct. 7, 8, 9	Test No. 3, second intra- dermal, Oct. 16, 17, 18	Test No. 4, first oph- thalmic, Oct. 23, 24	Test No. 5, second sub- cutaneous, Dec. 19, 20	Test No. 6, third intra- dermal, Mar. 11, 12, 13	Test No. 7, second oph- thalmic, June 11, 12	Postmortem
1	1	P	Not injected	P	P	5 c.c. N	S	P	L
	2	P		P	P	N	P	P	L
	3	P		P	P	N	P	O	L
	4	P		P	P	N	P	P	L
	5	P		S	S	N	P	P	L
	6	P		P	P	N	P	P	L
2	7	N	5 c.c. P	P	P	5 c.c. P	P	N	L
	8	S	S	N	P	N	N	O	L
	9	N	N	N	N	N	P	P	L
	10	N	P	S	N	P	S	P	L
	11	N	P	S	N	N	P	P	L
	12	N	N	N	P	N	P	P	L
3	13	N	15 c.c. P	P	P	15 c.c. N	P	P	L
	14	P	P	P	P	O	P	P	L
	15	N	N	N	N	N	P	P	L
	16	S	N	N	P	N	P	P	L
	17	P	P	N	P	S	O	O	L
	18	N	P	P	P	N	P	P	L
4	19	N	20 c.c. P	N	P	20 c.c. P	P	P	L
	20	N	P	P	P	P	P	P	L
	21	N	P	N	P	P	P	P	L
	22	N	P	N	P	S	N	O	L
	23	N	P	N	P	O	P	O	L
	24	N	N	N	P	N	S	P	NVL

NOTE.—P denotes positive; N, negative; S, suspicious; L, lesions; NVL, no visible lesions; O, no test or no postmortem.

after the third intradermal, or 8 months after the original test. Of the 21 animals tested 18 reacted.

All of the animals used in these experimental tests, 24 in number, were slaughtered. Of these 20 showed lesions, 1 no lesions, 3 no records of the postmortem findings.

In this series of tests we observed that after repeated injections of intradermal or subcutaneous tuberculin at short intervals, animals developed a marked immunization against tuberculin and did not re-

TABLE 3.—*Intradermal Test Followed by Subcutaneous and Ophthalmic Tests on 48 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Intradermal..	7	0	41	41	0
Subcutaneous	18	3	27	41	0
Ophthalmic...	13	1	34	41	0

act with any degree of accuracy; but these repeated tests seemed to increase the action of ophthalmic tuberculin.

The intradermal tuberculin used in all these tests was a 5 per cent solution of an alcoholic precipitated tuberculin.

Tables 3, 4 and 5 represent data collected from field tests in which the intradermal was applied 3 days prior to the subcutaneous and ophthalmic tests. The purpose is to show the effect of the intradermal upon the subsequent subcutaneous test.

The herd covered by Table 3 was composed of 48 animals of various ages; practically all had been raised by the owner, and had never been subjected to the tuberculin test. In the original subcutaneous test there were 28 reactors. These as well as the negative animals in the herd were, for experimental purposes, retested after a period of 60 days by the combination method, the order of application being intradermal applied 3 days prior to the subcutaneous and ophthalmic tests.

The herd covered by Table 4 consisted of 197 animals, mostly

TABLE 4.—*Intradermal Test Followed by Subcutaneous and Ophthalmic Tests on 45 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Intradermal..	10	8	27	16 ¹	0
Subcutaneous	34	6	5	16 ¹	0
Ophthalmic..	6	0	39	16 ¹	0

¹ The 16 animals in which lesions were found were all that were slaughtered.

purebred, and had been raised on the premises. There was no record of a previous test of the entire herd. As the result of the original subcutaneous test there were 106 reactors. A combination retest was made on the negative animals 60 days after the first test, the order of application of the tests being the same as in the preceding lot.

The results of this test practically confirm the previous one.

The herd covered by Table 5 was composed of 101 animals. As a result of the original subcutaneous test there were 60 reactors. A combination retest was made 60 days after the first test on the remaining 39 negative animals, the order of application of tests being the same as in the two preceding lots.

TABLE 5.—*Intradermal Test Followed by Subcutaneous and Ophthalmic Tests on 39 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Intradermal..	35	0	4	4	0
Subcutaneous	37	0	2	2	0
Ophthalmic..	35	0	4	4	0

NOTE.—The total number of reactors to these tests was 5. Two of them reacted to all tests, 1 reacted to the ophthalmic and intradermal, 1 to the ophthalmic only, and 1 to the intradermal only. Lesions were found in all of the reactors.

We have tested in this manner 15 herds, comprising 1,002 animals, with a total number of 322 reactors. Of this number 278 reacted to the intradermal, 275 to the ophthalmic, and 165 to the subcutaneous test. These results demonstrate that the intradermal test when applied 3 days prior to the subcutaneous test interferes with the action of subcutaneous tuberculin.

The next series of combination tests was applied simultaneously to demonstrate to what extent subcutaneous tuberculin interferes with intradermal, and Tables 6, 7 and 8 present some of the results.

The herd covered by Table 6 consisted of 30 animals, all purebred Holsteins. The aged animals had been acquired by purchase. The results of the original subcutaneous test showed 13 reactors. A combination 60-day retest was applied, using the three tests simultaneously.

TABLE 6.—Three Simultaneous Tests on 24 Cattle.

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	18	0.	6	6	0
Intradermal..	17	0	5	5	0
Ophthalmic..	19	0	5	5	0

NOTE.—Seven animals became of testable age in the interim between the original test and the retest. Comparatively uniform results were obtained from this combination.

There was no history of any previous tuberculin test on the herd covered by Table 7.

TABLE 7.—Three Simultaneous Tests on 22 Cattle.

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	7	0	15	17	0
Intradermal..	13	0	9	17	0
Ophthalmic...	7	3	12	17	0

The herd covered by Table 8 was composed of 24 purebred Brown Swiss cattle. The aged animals had been purchased, the young stock raised on the premises. There was no record of any previous tuberculin test on any of the animals.

TABLE 8.—Three Simultaneous Tests on 24 Cattle.

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	4	0	20	20	0
Intradermal..	9	2	13	20	0
Ophthalmic..	Not applied	.....	.....	.....	.....

NOTE.—The accuracy of the subcutaneous test was strongly marked in this combination, there being 20 reactors to it, while but 13 reacted to the intradermal.

Seven herds composed of 448 animals were tested by this simultaneous method, resulting in 31 reactors to the intradermal, 28 showing lesions, and 52 to the subcutaneous, 43 showing lesions. The results of the ophthalmic are not included in this summary, as that test was not applied to all herds.

Another manner of combining the tests was employed in a series where the subcutaneous was used as the original test and 3 to 7 days later the intradermal was applied. The results are shown in Tables 9, 10 and 11.

Table 9 shows the results in a herd of 46 animals, with no record of any previous tuberculin test.

TABLE 9.—*Subcutaneous Test Followed by Intradermal and Ophthalmic on 46 Cattle*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	19	1	26	28	0
Intradermal, 3 days later	29	0	17	28	0
Ophthalmic, 3 days later	15	6	25	28	0

There was no record of any previous tuberculin test on the herd covered by Table 10.

TABLE 10.—*Subcutaneous Test Followed by Intradermal Test on 46 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	2	0	44	41	3
Intradermal, 5 days later	6	1	39	36	3
Ophthalmic	Not applied				

Table 11 covers a herd of 55 animals. No tuberculin test had been made within two years. A number of animals had been purchased in the meantime.

TABLE 11.—*Subcutaneous Test Followed by Intradermal Test on 55 Cattle.*

TEST	NEGATIVE	SUSPICIOUS	POSITIVE	POSTMORTEM	
				LESIONS	NO LESIONS
Subcutaneous	6	1	48	47	1
Intradermal, 7 days later	8	1	46	47	1
Ophthalmic..	Not applied	.....	.....	.....	.....

These last three tables show that the tests have checked each other closely. We have had the opportunity to test but 6 herds, 175 animals, by this method (using the intradermal 3 to 7 days after the subcutaneous). There were 141 reactors to the subcutaneous, 136 with lesions, and 127 reacted to the intradermal, 124 with lesions; a total of 148 reactors, 143 of them showing lesions on postmortem.

CONCLUSIONS

1. It was observed in the work of the Pennsylvania Bureau of Animal Industry, in 1913, as shown in Table 2, when the subcutaneous and intradermal tests were applied simultaneously, that the subcutaneous had a modifying effect upon the intradermal reactions. This has been confirmed by our subsequent work.

2. It is shown in Tables 1, 3, 4 and 5 that the intradermal test when applied 3 days prior to the subcutaneous interfered with the subcutaneous reaction.

3. When the subcutaneous test is applied a few days prior to the intradermal it has a marked influence on the latter, but the interference is not as decided as when the intradermal precedes the subcutaneous test.

4. The ophthalmic test can be applied in any combination without being interfered with, or influencing the other tests. We have observed in animals which have reacted to the ophthalmic test a return of the ophthalmic reaction when later retested by the subcutaneous method. In one herd this occurred after a period of 78 days; of the 18 animals which had reacted to the previous ophthalmic test 13 showed a return of the local reaction.

From the results here shown, as well as from the observations of others, it is evident that we are in need of a uniform plan for applying the combination tests.

THE SUPERIORITY OF COMBINATION TUBERCULIN TESTS OVER ANY OTHER METHOD¹

By L. B. ERNEST, *Washington, D. C.*

IN the presentation of any material bearing on the subject of tuberculosis and tuberculin testing, a wide field for discussion is opened. No problem ever presented to the veterinary sanitarian has brought forth more divergent opinions. Therefore this paper will contain only such of the experiences of inspectors of the Federal Bureau of Animal Industry actively engaged in the campaign for the control and eventual eradication of bovine tuberculosis as bear on the use of the combination tests.

Were tuberculin an unfailing agent to be used in detecting the disease in livestock, the problem would resolve itself into one of selecting one of the various tests which would give the desired results by the simplest and least expensive method. Ever since tuberculin was discovered, however, it has been found to have certain limitations, the chief of which is that in some instances animals left in herds will be classified as healthy or non-reactors when they are in fact diseased and in many cases would be classed as spreaders of the disease.

Since the organization of the Tuberculosis Eradication Division in May, 1917, efforts have been made to reduce to a minimum the possibility that tuberculous animals may be classified as non-reactors and left in the herds to spread the infection further. That these efforts have been generally successful is shown by a recent investigation of 3,492 accredited herds. Altogether only 73 were found to contain reactors on subsequent tests. Of this number less than half can be attributed to failure of the tuberculin test, the others being directly attributable to negligence on the part of the owners in unnecessarily exposing their herds.

The records of the Bureau indicate that during the fiscal years 1918, 1919 and 1920 approximately 1,100,000 head of cattle were tuberculin tested under the coöperative plan. This amount of systematized work has afforded opportunity to demonstrate the practicability of using the intradermic and ophthalmic tests in conjunction with the method previously used.

The question of what check tests should be applied is not always easy to determine even though complete histories of herds to be

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

tested are available. Generally speaking, a combination of two or more tests should be applied to herds known to be infected or which contain animals of doubtful health. In grade herds animals are frequently found that have repeatedly changed ownership and the history is impossible to obtain. In stockyard cattle the same condition prevails.

In retesting suspects, a combination of tests should always be applied, since in these cases one application of tuberculin has failed to give satisfactory results. The previous history of retesting suspects, in all its aspects, has been unsatisfactory. Many methods have been advocated which were recommended as giving accurate results. However, it is known that suspects retested by the subcutaneous method after a previous subcutaneous test will fail to react in possibly 25 per cent of the cases, even though this percentage will be later found infected. This holds true if the retest is applied any time between 7 and 90 days. One lot of 14 suspects to the subcutaneous test slaughtered without retesting in 1918 were found to be 100 per cent tuberculous, 4 of them being unfit for food purposes.

During the last fiscal year the Bureau, in an endeavor to demonstrate the value of the 7-day method which has been advocated for retesting suspects, submitted to retest 343 known reactors. The result of this experimental testing showed that 214 of these reactors, retested within from 4 to 7 days, gave positive reactions, leaving 129 diseased cattle which failed to react the second time, of which 21 were found to be generalized cases, the entire lot having been slaughtered and careful postmortem examinations made. While no such extensive statistics have been gathered relative to the 60-day and 90-day retesting of suspects by the subcutaneous method alone, it is thought that possibly as large a percentage of diseased cattle are not being detected.

It is well to bear in mind that in considering any policy which would incorporate the continuous use of the combination of tests the practicability of the scheme must be considered, especially as it pertains to the amount of time involved and the number of available inspectors. In the classes of cattle previously referred to it is recommended that a combination of the three methods be employed, starting with the intradermic injection and the sensitizing ophthalmic disk. Observations may be made to determine the results of the sensitization tablet. At or about the seventy-second hour, when the intradermic test is completed, it has been usual to inject by

the subcutaneous method and check with the diagnostic ophthalmic disk, making the second instillation at about the eighth or tenth hour after the injection of the subcutaneous tuberculin. This method requires practically four days to complete a test. Results obtained from it have been splendid and have proved that in badly infected herds it should be carried out in order that the best results may be obtained.

Some experimental work covering application of the three tests was conducted during the period from December 1, 1919, to May 3, 1920. The cattle tested, approximately 200 in number, were of the canner type and were for experimental purposes a particularly favorable lot of cattle in that a large percentage of tuberculosis was found to exist. This method showed the ophthalmic method of testing to be somewhat superior to the other recognized methods in that fewer diseased cattle failed to react to that method. However, the advantage of a combination test was fully demonstrated, as two reactors and one suspect were taken as a result of the subcutaneous method, and two reactors and one suspect were found by the intradermic, which did not react to any of the other tests. Further, the fact was established that not a single generalized case of tuberculosis was missed as a result of the combination tests.

These data and many more which have been submitted at frequent intervals caused the Bureau to endeavor to determine the value of the various tests, namely, the subcutaneous, ophthalmic and intradermic. During 1919, experiments in tuberculin tests gave the following results:

Subcutaneous test: Number of cattle tested, 1,216; number reacted, 251; per cent of negative animals showing lesions on post-mortem, 5.39.

Ophthalmic test: Number of cattle tested, 1,538; number reacted, 278; per cent of negative animals showing lesions on post-mortem, 6.75.

Intradermic test: Number of cattle tested, 1,076; number reacted, 328; per cent of negative animals showing lesions on post-mortem, 11.51.

From these figures it will be noted that from 5.39 to 11.51 per cent of the animals negative to the single applications of tuberculin were found to be diseased when final examination was made on the killing floor.

A more recent report from a number of Bureau stations covering the application of the three methods of testing is as follows:

Per cent of lesions found, three tuberculin tests, fiscal year 1920

Locality	Subcutaneous reactors	No. lesion cases	Per cent lesions found	Intradermic reactors	No. lesion cases	Per cent lesions found	Ophthalmic reactors	No. lesion cases	Per cent lesions found
Iowa.....	1,977	68	96.57	1,187	33	97.23	.....	.....	.....
Missouri.....	41	10	75.63	327	49	85.00	1	1	.....
Illinois.....	1,064	34	96.81	87	2	97.70	4	0	100.00
So. Dakota.....	373	27	93.00	60	5	91.67	3	1	67.00
Vermont.....	2,895	31	99.00	42	1	97.62	426	10	97.66
Nebraska.....	479	19	96.04	195	5	97.44	36	12	66.67
Boston, Mass..	2,026	149	92.65	27	2	92.60	28	0	100.00
Salt Lake City..	121	3	97.53	859	32	96.28	.....	.....	.....
Portland, Oreg.	250	17	93.20	1,387	31	97.77	35	2	94.30
Totals.....	9,226	358	96.12	4,171	160	96.17	533	26	95.12

From this report it will be observed that the three tests have been shown to be relatively of the same degree of accuracy in that the percentage of lesions found in reactors from each test is approximately the same. It is believed that with a greater degree of knowledge concerning intradermic and ophthalmic tests this percentage can be maintained in all work of this character.

Other combinations besides the use of the three methods are possible and have given excellent results. In Vermont, under the supervision of Dr. A. J. DeFosset, many herds have been tested by combining the subcutaneous and ophthalmic methods. As an indication of the service rendered by these methods I can do no better than quote this capable inspector in charge. He states:

"There have been check-tested recently in Vermont by the ophthalmic method 39 herds of purebred cattle, representing practically all breeds, and the results have been most astounding. Had the ophthalmic test not been employed there would have remained in these herds 148 diseased cattle and a number of these herds would have been listed on the free list. Can you conceive of our eradicating tuberculosis unless we look carefully into each case to determine what method of test is required? These ophthalmic reactors were all slaughtered and showed unmistakable evidence of tuberculosis."

A still later report from this State shows that from 3 herds totaling 130 cattle 36 animals were removed which reacted to the ophthalmic method but which would have been classed as healthy as a result of the subcutaneous test.

This combination should be employed, as it is possible to make such check tests within the time consumed by the subcutaneous test alone.

The question of the period of time which should be allowed for sensitizing the eye after the instillation of the first disk has been discussed, and many persons recommend that three days be permitted to elapse prior to the use of the diagnostic disks. However, many herds have been tested and checked by the ophthalmic method by sensitizing the eye at the time the first preliminary temperature is taken, the diagnostic disk being used at the tenth hour after the injection of tuberculin by the subcutaneous method. This will allow a period of from 8 to 10 hours for observations to be carried on during the time the temperature readings are being taken. Pending more definite knowledge concerning the necessity for allowing 72 hours for sensitization of the eye, the ophthalmic test should be used wherever possible on herds undergoing test by the subcutaneous method.

Another combination possible is the use of the intradermic and ophthalmic tests, the former to be regarded as of major importance and the latter as a check against possible doubtful intradermic reactions. In using this combination it is recommended that the injection by the intradermic method be made and the eye sensitized for the ophthalmic test at the same time. No observations need be made to determine the results of the sensitizing tablet. At or about the sixty-seventh hour the diagnostic ophthalmic disk should be instilled, and an observation should be made on both tests at the seventy-second hour or possibly later.

A herd recently tested by this method resulted in 43 reactors being obtained from a herd of 55 purebred Holsteins. One observation was made at the seventy-second hour to determine the results. Forty-one of the reactors were classified as typical to the intradermic test, while 40 were classified as diseased by the ophthalmic method, 3 others being listed as suspects. It was shown further that the 3 suspects to the ophthalmic had given typical reactions to the intradermic and that 2 had reacted to the ophthalmic test alone, one of which was a 7-months-old calf and one an older animal. Of the 12 animals which passed the test, only one was over 6 months of age, and it was observed that these animals gave no indications of intradermic reactions and that the treated eyes were absolutely normal. The postmortem report made on the slaughter of the reacting cattle showed 5 generalized cases, 36 localized cases and 2 no-lesions. The 2 no-lesion animals gave positive reactions to both tests. This method of testing was tried on another herd a few days later with equally good results.

It is fully understood that the best results can not be obtained from the ophthalmic test where such a limited number of observations are taken. However, it proved its value in these instances in checking the intradermic test. A combination of this character is of especial value where the operator is not entirely familiar with intradermic reactions, in which case he will very probably, if the animals in question are tuberculous, have some eye disturbance to guide him in his classification.

The intradermic method of testing having been recognized by the Bureau on March 1, 1920, as official under the accredited-herd plan to be used as a first test of herds in those States which have also given it recognition, it would seem advisable to make a wider use of the combination presented. If this were done in all States in which the tuberculosis-eradication campaign is being conducted, much more ground could be covered. It is entirely possible that an inspector with a motor car could easily test from six to eight herds a week when the premises are conveniently located. A report recently received showed that one Bureau inspector in Iowa during the month of July had alone tested 61 lots containing 362 head of cattle, and in addition, with the assistance of another inspector, had tested 10 lots containing 227 head, a total of 71 lots and 1,009 head. Early clean-ups of many badly infected herds could be accomplished if this policy were adopted.

Another possible combination is that of the subcutaneous and intradermic methods. This, as a matter of check testing, is also very valuable, but it offers little opportunity for reducing the time required. One or two herds which have been tested by combining these two tests are of special interest. A test was applied to the herd of a State institution during May, 1920. This herd has a history of reactors being found in a number of successive tests. This particular test revealed 17 reactors, 16 of which reacted to the intradermic test and only 3 of which were found by the use of the subcutaneous. On slaughter of these 17 animals, 16 were found to be tuberculous. Another herd of 170 head was tested during December, 1919, from which 113 animals were removed as a result of the subcutaneous test. An intradermic injection was immediately given to the 52 animals which had failed to react to the subcutaneous, with the result that 14 additional reactors were obtained, all of which showed lesions of disease on slaughter. Another herd of 172 animals tested in June, 1920, revealed 32 reactors, 23 of which were slaughtered. Summarized, this report shows 10 reactors to both subcutaneous and

intradermic—postmortem results, 1 no-lesion; 3 reactors to subcutaneous which passed intradermic—postmortem results, 2 no-lesions; 14 reactors to intradermic which passed subcutaneous—postmortem results, 1 no-lesion; 1 reactor to intradermic which was suspect to subcutaneous; total, 28 reactors, 4 no-lesion. Many more such reports received by the Bureau are especially interesting in bearing out the conclusions regarding the necessity for using two or more of the methods in testing herds known to be badly infected.

In the follow-up work in establishing free herds, one important requirement should not be neglected. This refers to the postmortem examination of reacting cattle. Wherever it is possible special arrangements should be made to handle this class of postmortem work. When reacting cattle are consigned indiscriminately to slaughter centers, or are "posted" in the field by unqualified postmortem men, the results reported are frequently detrimental to the best interest of the eradication campaign. It is suggested that special arrangements be made to have this class of cattle slaughtered under the supervision of one man, or of a limited number of men, who are known to be particularly qualified, and under conditions which will enable them to give the best results. This condition does not exist at all slaughter points, as one or two animals may be slaughtered with a large number of other cattle where the conditions of light are insufficient and where the necessity of speed does not permit of the most careful examination being made. Results reported to the Bureau from single establishments where this class of postmortem work is conducted have shown its value. Vermont requires, with few exceptions, that all reacting cattle in the State be slaughtered at the establishment of the Burlington Rendering Company, Burlington, Vermont. During the fiscal year 1920 there were slaughtered under the supervision of Dr. C. C. Conley, inspector in charge at that point, 2,708 reacting cattle, of which 98.68 per cent showed lesions of disease. This inspector is considered by the Bureau as one of the most capable on this particular class of work. In a paper which he presented at the Portland (Maine) Tuberculosis Conference he calls particular attention to the fact that tuberculosis may be found in any part of the carcass and that the mere fact of no lesions being found in the regular lymph channels must not be accepted as proof that infection of tuberculosis is not present in an animal responding to the tuberculin test. A wonderfully satisfactory report was also received from Dr. W. N. Neil, inspector in charge at Chicago, indicating that from January 1 to March 3, 1920, 1,212 reactors were

slaughtered at that station, lesions being found in the entire number. This question of postmortem work is presented because of the fact that in using a combination of tests it is known that a considerably larger number of reactors will be obtained from infected herds and that among these will be very many old, pin-point, calcified lesion cases or animals in the early stages of the disease, and some with isolated lesions. More than that, it emphasizes the necessity of bearing out the results of the test by demonstrating lesions on postmortem examination.

In summarizing the results obtained from combination tests, the following points stand out:

1. Each method of testing has its value.
2. The use of all methods should be encouraged.
3. The combination of methods, having proven its superiority, should be used on all badly infected herds or on any animal of doubtful health, and in retesting suspicious animals.
4. There should be fewer animals classified as suspicious as a result of combination tests.
5. The most careful postmortem work is essential.

In conclusion, let it again be emphasized that it is imperatively necessary in the best interest of the tuberculosis-eradication campaign, which is directed toward the betterment of the live-stock industry, that every veterinarian should be familiar with the application of all the recognized tests.

DISCUSSION OF PAPERS ON TUBERCULOSIS

CHAIRMAN DAY: The discussion of papers on tuberculosis will be opened by Dr. Veranus A. Moore, of Ithaca, N. Y.

DR. MOORE: Mr. Chairman and Gentlemen: When the Secretary asked me if I would give a paper on this occasion, I told him I didn't see how I could, but I would be glad to give a discussion of one. I didn't know I would have the whole battle.

I feel it is exceedingly difficult to discuss a series of papers giving results in experimental work and recording facts. There are, however, a good many things in connection with tuberculosis that I am afraid are being overlooked, because the tendency is always to accept the latest thing out as the most efficient.

The first paper presented has the very distinguished merit of being consistent in method, and the results are very promising. I say method, because I believe to get rid of this disease or any disease there are certain fundamental biological facts to be taken into account, and any method that meets this condition will be successful. I do not believe there is a method or the method for eradicating certain diseases except one, the method of extermination, as in the foot-and-mouth disease. The control and elimination or reduction of disease widespread like tuberculosis introduces a complicated order of procedure. The first problem is to pick out the animal. The second problem is to dispose of the animal in such a way as to protect other animals, and the third problem is to get the owner of the animal so interested that he will do his part—and his part is the largest part of the whole proposition. That is amply demonstrated in

the control of tuberculosis in this country. Several times in the past thirty years, Professor Bang has told me that the success of his method and the real value of his method were in the fact that when the owner of an infected herd had reached the point where he had a sound herd, he knew enough not to expose his herd to reinfection. This is the whole crux. This is the whole thing—the education of the owner in getting rid of the disease. This is the most important thing.

If you will go back to the early work in Massachusetts, New York and Pennsylvania, where in testing the herds they killed the reactors, gave disinfectants and advice and went away, in four or five or ten years' time the herds were as badly infected as before. So I believe in the elimination of the disease through some definite and tried method. You older men know what I mean when I say that the older veterinarians in this country cleaned up a great many herds through the physical examination process alone. Dr. Law cleaned up a herd in New York before tuberculin was known, and when the herd was tested with tuberculin there were no reactors. As soon as the change in stewardship was made and a new man came in, that herd was tested and proved to be one of the most infected herds I ever heard of. I say the education of the owner is the first and most important thing.

The next is to pick out the infected animal and dispose of him. It is said that a 50 per cent infected herd is not worth saving. That depends upon conditions. I think when 25 to 40 per cent react, the whole herd should be considered with a great deal of suspicion. We have tested herds without reaction and later found them infected, we can't tell how long. I have one record where an animal was tested fifteen consecutive times, and the sixteenth time it was a reactor and when slaughtered was found to be a very pronounced case.

We have to consider also the disposition of these infected herds, which is a matter of detail and in the main an economic question. In this country we have lost many, many valuable animals through the slaughter method. The Bang method has not been a success in this country. It has not been recognized in this country because people have not understood it, and because the laboratory method of employing tuberculin has been approved. Consequently, hundreds and thousands of very valuable animals have been destroyed that might have given us their progeny.

In following the Bang method, in every case the owner had become interested through the advice of his practitioner and he had close and careful supervision during the time the herd was undergoing treatment, and consequently he was able to take all the precautions necessary to protect the sound animals. That is the case largely and results in maintaining sound herds.

While in Germany I spent some time where Dr. Ostertag was carrying out the physical examination. He tested to see what progress was being made. He picked out the bad animals. They did away with the tuberculin method as it had failed.

I think we ought to be very, very careful as to the indemnity. I believe that we can break up the practice entirely. I believe you will get better results and cleaner, healthier herds. As long as the Government will pay good prices, it will put a premium on diseased animals. Let us put the question, why should we pay a man who has had opportunity to read scores of articles and bulletins, but does not do anything for himself and turns over diseased animals to the State? Of course if a plague which he can not prevent gets into the herd, it is different. If we would reverse this and put a premium on sound herds, we would get along better than to put a premium on disease. In purebred herds it is different. I think those men will see to it that when they get a clean herd they will not admit infected animals. What I have said about indemnity I think it was borne out by what Dr. Eliason said in his paper that the owner will lose interest when he knows he will get paid for condemned animals.

In the early days it was done through the health department and not through the veterinary organization. Consequently the question of tuberculin was considered by the American Public Health Association. I had the honor of being chairman and published the report which it prepared on the preparation of tuberculin. There had been a lot of bad accidents where impotent tuberculin had been used. This was probably twenty or more years ago. These methods had been followed pretty largely by men with a good many variations. Naturally great advances have been made in recent years. Great care should be taken that the tuberculin is properly made.

Years ago when I was working on tuberculosis I had an organism which did not produce a tuberculin that was very efficient in case of bovine or human tuberculosis. We know that the bovine organism does not produce very efficient tuberculin. My experience is that the human variety is better than the bovine. I think there is considerable difference in different cultures. As to the dose, it was purely arbitrary in amount. We used that amount and everybody accepted it. It is a curious thing how we accept what other people do. There was a man in Minneapolis who wanted to use an extremely small dose. He maintained that you got more accurate and positive results than when you used the larger dose.

I don't know that we have any evidence as to just what tuberculin should be. With the larger dose and with repeated injections we will get such confused results that we can not tell which tuberculin is the best. Why does one tuberculin cause reaction and another not? We can explain better today just what the tuberculin reaction is. Are we going to be able to pick out this or that method as the best method? I am reminded of the two Irishmen who were looking at a flag. One said it was white and the other said it was red, and after a good fight they went and examined the flag and found it was red on one side and white on the other.

We have got to find where the cause becomes localized. If it is restricted to the lungs, it is not in the skin. It must be somewhere in the tissues. Where in the tissues should the injection be made to give the reaction sought? I think the problem is to find out what causes the reaction, and how much tuberculin is necessary, and what effect the tuberculin has on the tissues after this or subsequent reactions. I think that is exceedingly important.

I believe that if the three methods are better than one we should use the three; if two are better than one we should use two.

I think we should take this thing into account in its entirety, and educate the owner in the fundamental principles of eradication and control. We will make much progress. The accredited herd plan is interesting. You have heard other interesting things which speak for progress, and I hope they will continue.

CHAIRMAN DAY: This is a very important subject and of great interest to all of us, but I realize that we have a tremendously long program. I think we ought to devote a little time in discussing the questions that some may desire to ask.

DR. REICHEL: In the application of subcutaneous and intradermal tests at the same time, by the injections of tuberculin, practically all the tuberculin is absorbed later. I would like to hear from those making the tests as to how they inject the intradermal and subcutaneous at the same time.

DR. C. E. COTTON: What constitutes a typical subcutaneous and a typical intradermal reaction? There are various reactions in intradermal testing. This is the test recognized by twenty-five authorities working in accredited herds. We depend upon individual men to make individual readings. I find that the readings vary with the men and with the inspectors in charge. We are grasping at straws. If we are to maintain the continued support of our breeders in this country we ought to know where we are at.

CHAIRMAN DAY: Will somebody answer Dr. Reichel's question?

DR. REICHEL: In applying the combination intradermal and subcutaneous test, why is that not sufficient to sensitize the eye for a subsequent ophthalmic test?

DR. HEALEY: In looking into the various combination tests, the more I studied them the more puzzled I became, until the statement came up as these intradermal tests were being made, that thermal readings would be of great assistance. Out of 11 animals on which we conducted an intradermal test a short time ago 3 animals gave a typical thermal reaction. By all the rules they had to be considered as thermal reactors, but they gave only slight local swellings. You could not take them as intradermal reactors, but you could as thermal reactors with a typical rainbow curve.

However, I don't accept the statement that you can not make intradermal injections without receiving thermic reactions. On the other hand I would not feel it safe to make an intradermic reaction depend upon thermic reactions alone, for I do not believe you would uncover the large proportion of the reactors.

I did some work with the combination tests on 114 reactors by the sensitizing ophthalmic test. The subcutaneous test followed 72 hours later, when the second ophthalmic was given simultaneously with the intradermal, immediately after the postsubcutaneous temperatures were taken. All but one reacted to the intradermal and ophthalmic test. Not 70 per cent reacted to the subcutaneous test. One animal among these had a history of having been a reactor to the ophthalmic test and did not respond to a subsequent test.

As to the combination of ophthalmic and subcutaneous tests, we tested 40 reactors. We sensitized the eyes of 20 and they all gave very intensive reactions. The other 20 we did not sensitize at all, but depended largely upon the subcutaneous reaction, but the results were not so good.

CHAIRMAN DAY: Dr. Ernest, will you answer Dr. Cotton's question?

DR. ERNEST: What is a typical intradermic reaction? In so far as it can be put into writing it is generally known. One may take a so-called typical intradermic reaction and not be mistaken. At the same time there might be no visible swelling, but you would know there was an enlargement by manipulation. A close examination may show no enlarged lymphatics. I believe the simplest, surest and best way is to use it in conjunction with other tests until the operator is acquainted with the results.

DR. TURNER: One test interferes with the other. I thought the members could be left to draw their own conclusions from my paper. We have got to know more of the action of tuberculin. Some say that with anaphylaxis in the tuberculin test there is a certain time limit. We are going to stick to the Pennsylvania method for the present.

DR. COTTON (to Dr. Turner): Will you answer my question.

DR. TURNER: I studied eight months to learn what an intradermal test is. I don't feel qualified today as an expert.

DR. COTTON: All you need is experience. I say again I want to sound a note of warning, if we are to maintain the continued support of the breeders.

DR. REYNOLDS: Dr. Reichel, in taking thermal records, would a large dose by subcutaneous injection be likely to have an anaphylactic effect?

DR. REICHEL: It is true you can not always expect thermal reactions with the usual amount of intradermal tuberculin given. I don't say you can not at any time get the thermal reaction. It is fundamental that when once an animal is infected with tuberculosis and you give a tuberculin, you will get a reaction either locally or systemically or both.

DR. A. T. KINSLEY: I have had the privilege of conducting tests by the intradermal method. We have suspects or no-lesion cases in about 5 per cent of the total. We conduct our tests for 72 hours. When swellings are larger than the ordinary pea, we consider them large enough to make a diagnosis of tuberculosis.

DR. J. A. KIERNAN: We have the support of the livestock owners in the eradication of this disease. The whole campaign is founded on that prin-

ciple. It is based on the coöperation that exists between the livestock owners and the State and Bureau officials. What little success we have made in this campaign is because the livestock owners have assumed their responsibility in suppressing the disease. Every purebred cattle association in the United States is coöperating in making the tuberculosis eradication campaign a success. The swine growers are supporting the work in a splendid way; in fact, the keynote of the whole campaign is practical coöperation.

Another question is the paying of indemnities by the Federal Government. The first appropriation by Congress made no provision for reimbursing owners of condemned animals. The livestock owners went to Congress, however, and asked for indemnity for animals destroyed for the public welfare. Then Congress provided, not a premium for diseased animals, but a very small compensation to help out those owners, based on one-third of the difference between the appraised value of the animals and the salvage received; not to exceed \$25 for a grade animal and not more than \$50 for a purebred animal. Congress further provided that no money could be paid by the Federal Government unless at least the same amount is paid by the State, county or municipality.

As far as the Government is concerned there is not one single iota of law telling the owner how he shall dispose of his animals. The experience in most States is that purebred herd owners do not want to place their animals on a Bang farm because they do not want a Bang herd either on their farm or on a neighbor's farm.

Dr. S. O. Fladness, for the last few years Assistant Chief of the Field Inspection Division of the B. A. I., has been transferred at his own request to the State of Washington, where he will assume charge of the coöperative disease control work, with headquarters at Olympia.

Dr. W. P. Ellenberger, formerly Assistant Chief of the Tick Eradication Division of the B. A. I., has been appointed Assistant Chief of the Field Inspection Division.

Dr. R. E. Jackson, Inspector in Charge of coöperative disease control work in Texas, has been ordered to Washington, D. C., to assume the duties of Assistant Chief of the Tick Eradication Division.

Dr. R. A. Kelser of the Pathological Division of the B. A. I., has resigned his position to accept a Captaincy in the Veterinary Corps, United States Army.

Among those present at the recent Atlantic City convention of the Institute of American Meat Packers were Drs. R. Fred Eagle, John J. Hayes and Alvin O. Lundell, formerly of the B. A. I., but now in the employe of Wilson & Company, Armour & Company and Allbright-Nell Company, respectively. These veterinarians continue to manifest great personal interest in the success of all bureau activities.

VERMINOUS COLITIS OF DOGS, ITS MEDICAL AND SURGICAL TREATMENT¹

By FRANK H. MILLER, *New York, N. Y.*

BEFORE entering upon the subject-matter of this paper I would beg to be allowed to qualify its title to the extent of saying that it might perhaps be more appropriately designated as the surgical treatment of a certain form of colitis in the dog.

You may be pleased, or perchance disappointed, that I entirely disregard the time-honored custom of asking you to wade with me through a veritable sea of the literature of human and comparative medicine to assist me in establishing any points I may wish to make. I simply thank you, gentlemen, for the opportunity of being allowed in my own way to place before your distinguished body a few clinical observations of one who consistently tries to make his failures no less than his successes lend an equal and honest hand in helping to clear up some of the perplexing conditions under which comparative medicine is sometimes taught and oftentimes practiced.

I am entirely mindful of the fact that I may be termed something of a radical for even suggesting that any form of verminosis of the intestinal tract of animals should at any time come purely within the sphere of surgical procedure, but that is precisely where my experience leads me in this case.

With these things understood, I wish to submit carefully verified data in so far as they may be considered as evidence, and ask you in the light of your own experience to pass upon them.

In the practice of canine medicine, as we are all aware, the ratio of diseases of digestion and the digestive tract to other ailments is relatively high; and taking into consideration all patients at all ages, it is not too much to say that entozoal infections form a preponderant percentage of all cases demanding our professional attention within this field.

Throughout my active experience I have always—and perhaps rather obstinately, too—claimed the privilege of making my own diagnosis as against accepting that too often furnished by the client. It has become an almost inflexible rule with me to carry out a careful microscopic examination of the stools of all my cases wherever any purely intestinal disturbance (barring perhaps simple constipation and obstipation) has been under consideration, before

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

attempting to form a diagnosis, much less lay down a definite line of treatment to be followed. I consider the careless handing out of a treatment for worms in dogs—and, for that matter, in all other animals, where no worms have actually been seen, without such microscopic examination—nothing better than the rankest quackery, which invariably takes a heavy toll of perfectly innocent animal life and is eternally bringing this profession into well-deserved disrepute.

As years have gone by, these routine methods, while making clearer for me the pathway to more accurate, therefore more effective and safer, treatment of many of the conditions due to various species of worms, have also opened up vistas the width and depth of some of which I can not at present quite clearly define. For years, while making health surveys of large and small kennel establishments, which among other things comprises a painstaking recorded examination of the intestinal contents of each and every animal by name or number, I had never been able to understand why a very heavy percentage of all the grown-up animals examined, many of them showing relatively great numbers of eggs of *Trichocephalus depressiusculus* (commonly known as whipworms), remained permanently throughout their lives in perfect health, whereas isolated individuals at times broke down under the infection and invariably gravitated into a state of hemorrhagic colitis, which seemed in the vast majority of cases—I may say in all cases—to be beyond the possibility of successful medical treatment. It has indeed been most difficult to understand why this worm, the direct representative of what is known as *Tricocephalus dispar* in the human family, which, notwithstanding its broad distribution and well-known tendency to perforate the mucous membrane of the large intestines of men after the manner of a basting thread in the hands of a tailor, yet accounted by great clinicians as indeed nonpathogenic in man, can be, I will not say rapidly, but so certainly fatal in dogs, and that evidently without regard to their size, breed or stamina.

These cases marked by diarrhea or dysentery cropping up from time to time in my practice, coming almost invariably like a bolt from a clear sky, the only visible antemortem evidence of possible cause of disease being whipworm eggs, and those not invariably in great numbers, in the stools, have caused me to carry out a number of careful autopsies with the somewhat astounding result that in every single case the cecum of the victim has been found to be the

seat of heavy infection with these worms, very few parasites in these fatal cases having been found outside of that organ. In plain terms, the animal had in every case succumbed to marasmus due to intense subchronic inflammation of the ceca-colic mucosa. The appearance of perhaps half a score of these remarkable cases scattered over as many years in my practice, almost invariably occurring in animals of real or imagined high value, made speculative or experimental operations practically out of the question.

Fortunately, on January 27 of the present year we were permitted to do our first operation in the treatment of such cases, the remarkable results of which have made it comparatively easy since that time to secure operations in similar cases in numbers sufficient, I think, to warrant us reasonably in assuming that our deductions are being based upon sufficiently solid foundations. I cannot, perhaps, do better than to epitomize the history of some of these operated and other cases, specimens from which I am here fortunately able to place in your hands for critical examination, that you may the more readily appreciate the comparative ease and accuracy of diagnosis and realize the advantages to be derived from early operation in similar cases.

CASE NO. 1

Male Aberdeen terrier, about 18 months of age, owned by Miss M. K., a well-known animal painter, of New York City.

The animal, weighing about 22 pounds in fair state of flesh, was presented at my office for examination for purchase on or about December 12, 1919, and was refused owing to the microscopic examination of the stool showing him as being infected with both hookworms and whipworms. Several days subsequently the owner presented him for treatment, with the statement that he was subject to periodic attacks of severe intestinal indigestion marked by frequent, copious, gaseous dark-colored evacuations, oftentimes passing considerable blood and mucus; would lose flesh rapidly during, and rally between, attacks, which were essentially intermittent in character.

The owner, under my direction, carried out a carefully regulated medication of ascending doses of thymol, which ultimately reached 18 grains per day and was continued until gastric irritability showed it could not be continued. On December 28 the patient was presented for stool examination, with the result that there was shown a perceptible diminution of the hookworm eggs, but no visible change being evident in those of the whipworm. The owner was directed

to reduce the amount of thymol to 10 grains daily and take up the use of oil of chenopodium in 5-drop capsules, giving one capsule morning and night for 3 days. The dog tolerated this dosage well, but owing to another heavy attack of dysentery, was placed in hospital January 19, and we were instructed to use our judgment as to further medication. From that date the dog was given one 5-drop capsule oil of chenopodium morning and night for four days. On the morning of the fifth day there was marked muscular weakness and incoördination up to a point where the animal had a trembling gait. The drug was therefore temporarily discontinued. After 24 hours the animal again appeared normal in movement; incoördination had entirely disappeared; but the intestinal discharges were alarmingly profuse, fetid, and contained much blood-stained mucus.

These conditions were serious, and were treated by me to the best of my ability, but absolutely no impression could be made upon them with various astringents. He was therefore given on January 25 7 drops oil of chenopodium in 1 teaspoonful castor oil, with a like dose in the evening. Incoördination being again quite noticeable on morning of January 26, and examination of the stool showing total absence of hookworm eggs, but the number of whipworm eggs appearing to be uninfluenced, we advised experimental operation, which was readily accepted by the owner as her contribution to science.

For diagnostic purposes, which will later appear, 1 grain of phenolphthalein was administered by the mouth on the evening of January 26. At midday January 27 the excreta received the caustic potash test for phenolphthalein, which was found in abundance.

The animal being somewhat weak, received 1 ampule camphorated olive oil by intramuscular injection with 1/100 grain atropin sulphate hypodermatically, followed in one hour by other anesthesia, which was well borne. The abdomen was clipped and sterilized as for any abdominal section; a short longitudinal incision was made at the right side of the propuce; the cecum, located with great ease, was lifted out and separated from contiguous intestines by screeding, small bleeding points being closed by torsion. Two strong and carefully placed chromicized gut ligatures being thrown about the proximal end of the appendix and firmly tied, excision was made, the stump being thoroughly treated with iodine. The patient was then placed in the inverted position to facilitate suturing of the wound with ordinary sterilized gut. Owing to the proximity

of the wound to the prepuce, bandaging for obvious reasons was not used.

The patient made an uneventful recovery, although, owing to the intestinal irritability, which was gradually overcome, convalescence was not quite so rapid as from oöphorectomy in the normal animal. The wound was, however, solidly healed within six days. Full health, vigor and strength was regained in about one month.

Careful stool examination made upon third day after operation showed the animal to be entirely free of all whipworm eggs.

The physical appearance of the cecum in situ showed a decided dilation, the organ being flabby in appearance but entirely free of all evidence of peritoneal inflammation, present or past. There was, however, well-marked enlargement of the mesenteric lymph glands in the ceco-colic region. When removed the cecum was found to be filled almost to capacity with whipworms. A smear examination was made of the contents which revealed myriads of whipworm eggs. The caustic potash test of the cecal contents was also carefully made for phenolphthalein, which was entirely absent, although abundance of it was demonstrated in the rectum prior to operation, conclusively showing that the intestinal contents did not circulate in the appendix to any extent. Examination of the muscularis and mucosa of the organ showed them to be perceptibly thickened.

At the end of two weeks stools began to show formation and they were quite normal at the end of one month. The animal's health remains perfect.

CASE NO. 2

Adult wire-haired fox terrier, male, owned by Mrs. E. B. C., New York City, brought to hospital from Williamstown, Mass., February 6, 1920, with the history that the animal had been suffering for several weeks from periodic attacks of diarrhea and dysentery, much mucus being in evidence. The animal had received good rational treatment along the lines of intestinal antiseptics and astringents by the local practitioner. The period between attacks had grown continually shorter until time of arrival, when they were practically continuous.

The usual examination of the stool showed a few scattering eggs of ascarids and an abundance of those of whipworms. The spirit and appetite were good, but the animal was emaciated, and the skin, while loose, had lost much of its resiliency; the coat was staring and rough.

The patient was put upon treatment of 5 drops oil of chenopo-

dium morning and night, with the result that all *Ascaris* eggs were absent on the third day, and whipworm eggs were notably diminished. February 10 the dose of chenopodium was raised to 5 drops with 1 teaspoonful castor oil three times daily, with the result that well-marked incoördination was present on the morning of the 11th. Medication was therefore discontinued until February 14, when, the animal seeming to be fully recovered in movement and the stool still showing a few whipworm eggs, the dosage was again taken up at 5 minims chenopodium plus 1 teaspoonful castor oil three times daily, all of which was retained. On the morning of the 15th incoördination was again present to a marked degree, with complete anorexia. Stool examinations on the 16th and 17th showing no appreciable reduction of the whipworm eggs, operation was advised and accepted by the owner.

For diagnostic reasons the animal was placed under anesthetic February 19 and a careful but energetic massage and kneading of the abdomen over the region of the cecum was made, with the result that stool examination made January 20 showed a greatly increased number of whipworm eggs over the last previous examination, in fact, exceeding the number seen upon his entry. February 22 at midday the animal received 1 grain phenolphthalein by mouth, and February 23 a final stool examination was made, which showed a few whipworm eggs still remaining. The test for phenolphthalein also revealed the presence of that drug in abundance in the excreta.

The animal, having been duly prepared, was operated on February 23 at 3 p. m., in a manner identical to case No. 1. Conditions on adspsection were similar in all respects to that case; viz., absence of evidences of acute or chronic peritoneal inflammation, cecum slightly larger than normal and flaccid, well-marked enlargement of the mesenteric lymphatic glands corresponding to that region.

The cecum was found to be choked with whipworms and smears of its contents showed a great abundance of their eggs. The potash test for phenolphthalein here also failed to show that drug to have entered the appendix, at least in quantities sufficient to give reaction.

The animal made an extremely rapid convalescence.

Examinations of the stools made February 25, or two days after operation, showed entire absence of all kinds of worm eggs. Stools were well formed on the sixth day, and after three weeks the animal seemed to be in normal weight and vigor and so remains.

CASE NO. 3

A small, indifferently bred male Irish terrier puppy, approximately 6 months of age, owned by Dr. S. C., New York City, was prescribed for in December, 1919, as suffering from distemper, from which it made a satisfactory recovery. Was again presented February 12, 1920, for intestinal irritability, which had caused much emaciation.

Stool examination showed presence of ascarid, hookworm and whipworm eggs in abundance, the history and symptoms being practically identical to cases 1 and 2. The animal, which was very light and anemic, was given triurnal doses of 4 drops oil of chenopodium plus $\frac{1}{2}$ teaspoonful castor oil. Microscopic examination made on the third day of treatment showed total absence of all ascarid eggs and great reduction in the number of hookworm eggs. Symptoms of gastric uneasiness and decided muscular weakness appearing on the third day, treatment was discontinued for two days and again taken up at the same dose.

Stool examination made February 19, when almost complete anorexia had developed, showed total absence of hookworm eggs with a few whipworm eggs still in evidence.

Operation was decided upon and was performed without incident on February 23, as in cases 1 and 2. The findings corresponded in all ways to those cases, with one noticeable exception, that in this case there was well-marked evidence of some chronic peritoneal inflammation as manifest in slight local adhesion. The cecum was well filled with a felt-like mass of whipworms. Stool examination on the fifth day after operation showed complete absence of worm eggs. Recovery was rapid and seemed complete on the twelfth day. The animal remains in good health.

CASE NO. 4

A red male Dachshund, about 8 months of age and medium size but greatly emaciated, owned by Dr. A. V. M., New York City, was presented March 24, 1920. The animal had been suffering from an intense diarrheal condition for some time, passing much mucus and blood, and had utterly failed to respond to rational home treatment and simple medication.

Microscopic examination showed many eggs of the whipworm.

Astringent treatment in the form of tablets salol compound in comparatively heavy doses was used without result. The animal was placed in the hospital March 27 and received 4-drop doses oil

chenopodium plus castor oil twice daily for 2 days, when the dose was raised to 3 drops of the drug. At the end of 2 days, or on the evening of March 30, when his appetite became almost nil and pulse poor, the drug was discontinued and stool examination was made, showing marked reductions of the whipworm eggs. Compound salol tablets were again used in an effort to check bowel activity, which was great. On April 4 the bowels were apparently checking, but they opened again the same night.

On the morning of April 5 there were indications that the animal had undergone convulsions of some kind during the night, but he did not show it in his mental state. He took some food, but was extremely weak and had several copious black gaseous bowel discharges during the day; was found dead at 4 p. m.

Autopsy showed the cecum to be absolutely blocked with whipworms, no worms being discovered in any other part of the tract. As in cases 1 and 2, there was not the slightest trace of peritoneal inflammation. The mucosa of the colon was visibly thickened and moderately inflamed, but no ulcerative changes were marked. The mesenteric lymph glands of that area were much enlarged and infiltrated.

This case is of particular interest as showing that we probably erred in trying to defer operation in the hope that such an animal, at that stage of the disease, might be built up, as it were, for operation. In these cases they constantly lose weight, and with it strength, and after a certain time become poor operative risks.

CASE NO. 5

Male Irish terrier, 10 months of age, owned by M. C. J., New York City. Patient was a nervous, well-grown, but poorly nourished animal that had appeared at my hospital at various times for gastrointestinal indigestion.

The stool examination showed plenty of ascarid and a few whipworm eggs.

Owing to the weakness of his digestion he received 6 grains of santonin, which expelled all ascarids, this being followed up with 5 compound salol tablets 3 times daily and suitable diet. This having the effect of establishing a more or less satisfactory function, the animal was discharged. In this particular case, owing to the paucity of whipworm eggs associated with a very weak stomach, we elected not to use chenopodium.

On April 13 the animal was again returned to the hospital much

emaciated due to an almost continuous state of diarrhea with vomiting. The stools contained much mucus and at times large quantities of blood. Although the appetite was fickle, the spirit was amazingly good.

Triurnal doses of 5 drops oil of chenopodium with 1 teaspoonful of castor oil were well borne until the third day, when vomiting, muscular weakness and thready pulse appeared, indicating its discontinuance. Stool examinations showed only a very limited number of whipworm eggs.

Alarming symptoms having passed, on April 19 the dog was again placed upon the same dose of chenopodium (5 drops t.i.d.), with the result that on April 22 well-marked incoördination was present with all but complete anorexia. Treatment was again suspended and the animal rallied, but the number of whipworm eggs had not visibly diminished.

Appendectomy was advised and was accepted by the owner, and was performed April 29, resulting in rapid and complete restoration to perfect health and vigor, in which state the animal remains.

This case is of particular interest in that it shows the cecum quite choked with the parasites, whereas the stool examinations at no time showed great numbers of the eggs. Hence, the gravity of cases can not at all times be reliably computed by the microscopic findings.

CASE NO. 6

A pedigree male Welsh terrier, approximately 10 months of age, owned by L. T. D., New York City. This animal, which had been prescribed for some months before as suffering from follicular mange and successfully treated, was presented at the hospital April 1, 1920, for general unthriftiness and periodic attacks of dysentery.

The stool showing an abundance of whipworm eggs, the owner was instructed to give daily doses of 5 drops oil of chenopodium, which was more or less strictly followed out until April 26, when he was again examined only to find plenty of the eggs remaining.

May 1 the dose was raised to 4 drops of the oil morning and night, which had to be discontinued after 3 days owing to general weakness of the patient. The muco-sanguineous discharge continuing, operation was accepted and carried out as on all other cases on May 16, the animal having received 1 grain of phenolphthalein and a heavy abdominal massage on the previous day.

The findings on operating were identical in all respects to the other cases. Test of the rectal stool for phenolphthalein was positive.

while that of the contents of the cecum was entirely negative. Myriads of whipworm eggs were found in both. The cecum was well filled with the parasites. Recovery was rapid and complete. The usual tumefaction of the mesenteric lymphatic glands was well marked. The animal, although nervous, still remains in fine health, with no evidence of the parasites.

CASE No. 7

A fine male Belgian police dog, about 2 years of age, owned by A. F., New York City, entered the hospital July 7, 1920, under suspicion of distemper, having a cough, some irritation of the eyes, emaciation and diarrhea, a diagnosis which was perhaps too easily made by reason of there being other positive cases of the disease in that kennel, but which diagnosis was found to be absolutely incorrect, the animal having beyond question passed through the disease in the puppy form.

His symptoms from the side of the respiratory organs and eyes cleared almost immediately, but the intestinal discharge became most frequent, great quantities of dark brown gaseous fluid being passed with much tenesmus. Microscopic examination showed the stool to be carrying great numbers of whipworm eggs and a few hookworm eggs. Anemia was marked, but spirit and appetite were remarkably good. Expectant treatment of intestinal astringents and antiseptics were adopted in preference to operation, since we were still to some extent uncertain about distemper. These made absolutely no change in the case, and as he emaciated very, very rapidly, we placed him upon 8 drops oil of chenopodium plus 1 teaspoonful castor oil morning and night for 3 days, when vomiting became marked, causing us to discontinue its use.

Stool examination July 15 showed the total absence of hookworm eggs and a gratifying diminution of those of whipworms. The patient had, however, grown so gravely anemic and emaciated that I feared chenopodium in doses likely to be effective, and asked for operation as a last resort, which was gladly allowed. July 17, after receiving 2 ampules camphor olive oil intramuscularly and 1/75 grain atropin sulphate hypodermatically, he was operated on under careful ether anesthesia, as in all other cases. The animal rallied quite satisfactorily. Two large liquid stools and some blood were passed during the night. Pulse and temperature were satisfactory on the morning of the 18th, but at midday the temperature began to go up, reaching 105 at 6 p. m., and dropped to 99 at 11 p. m., death following during the night.

The cecum of the animal contained a mass of whipworms, and there was evidence that the peritoneal coat of that organ had at some previous date been at least mildly involved. There was, as in all the other cases, great enlargement of the mesenteric glands. No parasites whatever could be found in the tract outside of the appendix.

This case is of equal importance with case 4, as clearly showing that there is a decided time limit in all these cases which must be taken fully into account when forming our prognosis.

Finally, in submitting these reports, I wish to make it clear to all that there is no single word of mine, expressed or implied, that would even remotely convey the impression that the simple fact of an animal carrying whipworms stands in imminent danger, since, as in the human family, we know the percentage of animals carrying the whipworm, without obvious impairment of health, is extremely high, and, as in man, the number of cases where they give rise to symptoms are exceedingly low. Neither do we wish to popularize the word appendicitis, since the condition produced by the worms in no degree resembles appendicitis as known in the human, since the aberration of function which ultimately brings about death in the animal appears to be practically always confined to the colon, a condition seemingly induced by long-continued irritation by these worms when they become lodged in mass in the cecum, where they seem to produce but little local change. We are, however, by reason of our experience, forced to the belief that when these rare but exceedingly grave complications do arise in the dog not 2 per cent of the cases will be recovered under medical treatment, since, as our tests seem to show clearly, the seat of the disease can not be reached by the anthelmintic, whereas timely surgical treatment will in itself carry slight danger to the animal and holds out the highest possible prospects of a speedy and complete recovery.

I venture to forecast that the next decade will place this almost certainly fatal form of worm infection of the canine species within the class of easily diagnosed and most successfully treated of the diseases of animals.

DISCUSSION

THE CHAIRMAN: We are ready for questions on this interesting and well-prepared paper of Dr. Miller's.

DR. FLYNN: I would like to know how early you are able to detect parasites in the animals.

DR. MILLER: In making examinations we find this condition in adult dogs. We don't find it under 5 or 6 months. We find a low percentage

in adult dogs. In some countries they put the percentage of those affected at about 40 per cent. I think it is more than that here. About 60 per cent of the dogs in this country carry that. It occurs only sporadically, but when it does, it means something.

DR. MCAUSLIN: I would like to ask Dr. Miller if in his opinion the whipworm is exclusively responsible for this condition—if there are not some others, say the hookworm, that are responsible. My reason for asking that is that he made reference to the use of thymol and then switched to chenopodium.

DR. MILLER: We use thymol because it will remove almost any kind of worm. We have used it in the eradication of hookworms. Possibly hookworms do figure to some extent in those cases because they do weaken all dogs. You can go through these appendices and you will find no traces of anything but the whipworm. It is my opinion that there is a long-continued local irritation set up there by which the colon ceases to function properly. I don't think the hookworm figures in this case at all. We get the hookworms so frequently and treat them successfully, so I doubt if they have any debilitating effect upon the patient which would be a predisposing cause for any disease.

Notice has been received of the establishment at Pretoria of the South African Veterinary College in connection with the University of South Africa. A veterinary faculty will be organized by the Institute of Veterinary Research under the direction of Sir Arnold Theiler, Director of Veterinary Education and Research. It is proposed to require a five year course of which the first two years can be undertaken at any university or college teaching pure science subjects and veterinary anatomy and physiology, the final three years being devoted to specialized professional training and leading to the degree of Bachelor of Veterinary Science in the University of South Africa. It is recommended by the Commission on this subject that provision be made for a Doctorate of Veterinary Science in the University, but this plan has not been developed.

France has published a decree effective August 7, 1920, prohibiting the importation into France of cattle, sheep, goats, and swine from all countries except from French colonies and protectorates.

"Because the anthrax now spreading among livestock in Oklahoma is of an unusually violent form, the serum used so far in treatment has not rendered the animals completely immune, said Dr. Robnett, State veterinarian, recently. About 3,000 cattle, horses and mules have been inoculated with antianthrax serum. Nearly 500 head of cattle and horses have died in Pittsburg County within the last week. Over a quarter of the county is under quarantine."
—*Wichita Daily Stockman*.

CÆSAREAN SECTION IN SWINE¹

By W. E. MACKLIN, *Coon Rapids, Iowa.*

THERE is an increasing demand for this operation, brought about by the high market value of swine. I am forced to believe that a great many qualified veterinarians avoid this work, as the practitioners in two of the near-by towns turn down such calls. The veterinarian who does this operation will find out that it not only pays but will help him in building up a good hog practice, an essential part in a paying practice, at least in the great Corn Belt. The operation is most commonly performed on the farm, under conditions most unfavorable, though sometimes such cases are brought in to the hospital.

To be practical, the operation will be described as performed on the farm. In cases of dystokia it is necessary to decide to operate early if the operation is going to be successful. A few points will be mentioned to help one in deciding when to operate at once and when to attempt the slower method of delivery.

All cases in which the birth canal is found to be too small should be operated on at once, while cases of slow uterine contractions can often be relieved by the use of pituitary extract. Cases of dystokia due to abnormal presentation of the fetus can be relieved without an operation.

If the sow has delivered quite a number of pigs it is permissible to attempt delivery through the birth canal. On the other hand, the same kind of a sow with no pigs by her side should be operated on at once.

When not to operate:

- (1) When there is a complication of an infectious disease.
- (2) When the sow is badly lacerated by the improper use of instruments.
- (3) When the case has advanced so far that gas is present in the uterus. Gas, in my experience, is sufficient to spoil all chance of a successful operation.

No certain time limit can be put on the time between when labor sets in and when it is too late to operate. Each individual case must be decided on as it is presented, the history, symptoms, etc., being an aid in deciding on the prognosis. Never operate when

¹ Presented at the Fifty-seventh Annual Meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

there are no pigs in the uterus, as it is rather embarrassing; at least that is my experience.

An operation decided upon, sterilize the following instruments: Scalpel, probe-pointed bistoury, a pair of blunt-pointed curved scissors, several artery forceps, pincers, needle holder, needles, vulsellum forceps, suture material, sterile linen thread. An antiseptic solution and a white cloth to cover the field of operation should be on hand.

Provide a temporary operating table out of anything available; a couple of saw horses with an old door or scoop board on top, or a crate laid on its side. Never operate on the floor, as you will be badly handicapped.

When the sow is in the nest, give her morphine sulphate hypodermically, from 1 to 3 grains, according to her size, so it will be acting by the time you are ready to operate.

Place the sow on the table, and fasten her securely, the front legs and under hind leg. The upper hind leg can now be held backward by one man.

Clip the hair and shave from the region of the flank, and paint with tincture of iodine. Wring out the white cloth from the antiseptic solution, and cover the entire side of the sow with it. Cut a hole through the cloth to expose the operative area.

Make a bold incision through the skin down to the muscle, about 3 or 10 inches in length. Divide the muscles in the direction of their fibers. Incise the peritoneum. Reach in and bring out the entire cornua. Make the incision into the horn as near as possible to the body of the uterus. Remove the fetuses with the aid of vulsellum forceps. Grasp each pig, whether dead or alive, firmly with the forceps, as it can be done more quickly in that way. Return the empty horn, keeping the incision in it to the outside.

Bring out the lower horn, and if the pigs can be readily removed from the first incision, all well and good; if not, after closing the incision in the first horn, make a new incision wherever convenient in the last horn. Don't waste time by trying to deliver the pigs through one opening in the uterus. If the fetal membranes come away readily, remove them; if not, leave them. In many a case where it was impossible to remove the membrane it was left. They are always found behind the sow in a few hours.

Close the uterine incision, using a Lembert's bowel stitch. Replace the horn, make a manual exploration of the abdominal cavity to see if both the cornua are in place and if any pigs have

been left behind. Suture the peritoneum, using a continuous suture. The muscles will come into position, but a stitch may be put in to keep them in position. Unite the skin with four interrupted sutures, started well back from the edges of the incision, leaving a slight opening at the lower end of the wound for drainage if necessary. Sponge dry and paint with tincture of iodine. Apply a dry dressing of iodoform and boric acid.

Place the sow in a clean, dry, well-ventilated pen. She will probably not care what happens for from 12 to 24 hours. Provide fresh water. After 24 to 36 hours give sweet milk or other nourishing food. Remove outside stitches in from four to five days.

In closing let me emphasize a few points which are firmly impressed on my mind. A great deal of judgment is required in selecting cases to be operated on, as there is no chance of building a reputation on a fatal case—at least not the kind of reputation we are after.

As to an anesthetic, do not operate without some agent, for if you do, many hopeful cases will die of surgical shock. In my work without competent help a general anesthetic was dropped as impracticable. For a time nothing was given, with the results mentioned above. When I started with morphine hypodermically my percentage of successful cases rose at once.

The more speedily the operation is performed the better the results. Make sufficiently large openings so as not to be handicapped in time.

Above all, use antiseptic precautions. Choose the cleanest place available for the operation, which may be out in the open.

As to the percentage of successful cases, if you select the cases you can have 65 or 70 per cent of recoveries. Often I am influenced by the farmer in operating, but I am satisfied that if you select the better cases the successful results will be at least 70 or 75 per cent.

DISCUSSION

DR. SIGLER: I would like to ask how you handle those cases where you find the bladder greatly distended.

DR. MACKLIN: In those cases where the bladder is greatly distended with urine, you can relieve that by drawing back on the bladder with the hand. In other cases, where it is too badly distended, you can use a catheter. In those cases that have gone too far, when a fetus has been lodged in a pelvic cavity for a good many hours, it is an absolute obstruction to the passage of urine. Those are pretty bad cases. They have been in that position too long, but sometimes you can empty the bladder.

We all know that morphine brings on constipation, but if your sow has been healthy and in good condition up to farrowing time and she has gone up to that labor in that condition, one dose of morphine doesn't bring

any bad results. The cases that live through the first 24 hours generally recover, and constipation won't hinder the case until later than that. That has been my experience.

When you open up the abdominal cavity and find the bladder already ruptured, you might just as well quit.

DR. STANGE: I would like to ask the Doctor from which side he operates; also as to results in hot or cold weather.

DR. MACKLIN: You can operate on either side. I prefer the right side. As to hot or cold weather, the best results I ever had have been in the month of August. I operated on three sows for one owner. He had brought home a lot of old meal and left it where the sows got to it. They didn't deliver the pigs. That was in the hottest weather. However, most of the cases we have to operate on are in the cold spring months.

DR. SIGLER: How about the seat of operation?

DR. MACKLIN: The seat of operation is about the short ribs, the lumbar vertebrae, and right there in the region of the flank.

DR. CAUGHMAN: Do you advise breeding the sows after those cases?

DR. MACKLIN: I never had that come up, but one man who had a successful case had the sow bred accidentally within a week afterwards. It was a very remarkable case. I wouldn't advise taking those sows for breeding. One reason is that they have difficulty in delivery, and I would advise that those cases go to market.

DR. JUHL: I would like to ask if the number of pigs removed has any influence on the success of the operation.

DR. MACKLIN: As a rule, the patient has a better chance of recovery where there are fewer pigs left in the uterus, on account of the fact that it takes a shorter time to operate; but if the sow is operated upon early and the pigs are alive, you can remove quite a number of pigs and still the operation will be successful.

DR. ELLIOTT: Coming right down to hard tacks, I want to know what fee he charges.

DR. MACKLIN: A number of years ago, when I first started to operate, I charged \$5.

DR. H. H. SPARHAWK: I would like to ask if any practitioners who perform Cæsarean section are using atropin about the time the operation is completed, the object being that the blood is centralized, and using that with the idea of preventing surgical shock. The point I would like to bring out is that it was called to my attention by a physician in Detroit, who was originally a sheep man in Indiana. He said he had gained most of his experience along those lines in the sheep industry, and he had saved about 80 per cent of the cases that would ordinarily be mortal by using atropin.

The North Carolina Agricultural Extension Service is authority for the following statements as to the value of purebred sires in increasing production:

The milk productions of heifers out of ordinary cows and sired by Holstein, Jersey and Guernsey bulls increased over that of their dams by 64 per cent. The fat production increased by 52 per cent. The second generation increased in milk production over the original cows 130 per cent; in fat production, 109 per cent. Pigs from a purebred boar will average 25 per cent more mature weight on the same quantity of feed than pigs from a scrub boar.

CLINICAL AND CASE REPORTS

PNEUMOCOCCI AS THE CAUSE OF A SPORADIC CASE OF CROUPOUS PNEUMONIA IN A COW

By E. L. STUBBS

Pennsylvania Bureau of Animal Industry

ON March 16, 1920, organ sections from a cow (lung and intestine) were received at the laboratory of the Pennsylvania Bureau of Animal Industry, with a request that they be examined for *Bacillus bovisepiticus*. The history was as follows: This animal developed an acute attack of pneumonia and died in the course of a few days. Necropsy revealed hemorrhagic inflammation of the serous membranes and lobar pneumonia. The attending veterinarian believed it due to *B. bovisepiticus* and forwarded specimens to confirm his diagnosis, and, at the same time, ordered vaccine for the remainder of the herd.

A microscopic examination of the tissues received showed hemorrhagic inflammation of the serous coat of the intestines, hemorrhagic inflammation of the pleura, and croupous pneumonia. An emulsion of the lung tissue was plated on plain agar and injected subcutaneously into rabbits. The plates failed to reveal *B. bovisepiticus*. One rabbit died the third day after inoculation. Necropsy revealed hemorrhagic inflammation of the subcutaneous tissues at the site of injection, hemorrhagic tracheitis, acute splenitis, petechial hemorrhages over the large colon, and highly injected serous membranes. Microscopic examination of the heart blood showed it to be teeming with diplococci which, after proper staining, showed a large, distinct capsule. Pure cultures were obtained on blood agar and further studies proved the organisms to be pneumococci. The second rabbit died on the fifth day, showing lesions similar to the first, and the same organism was readily isolated from the heart blood.

Croupous pneumonia of cattle generally develops as a consequence of the localization of an infectious disease or as a complication in the course of a variety of diseases. Whether occurring as a primary or a secondary disease, it is caused by infection. The *Bacillus bovisepiticus* is credited as the infective agent in a great majority of cases, and as little mention is made in the literature of other organisms, particularly the pneumococci, as of any etiological importance, it was thought advisable to report this case.

RINDERPEST IN BELGIUM

In the "Bulletin du Service de la Police Sanitaire des Animaux Domestiques" of the Belgian Department of Agriculture, No. 14, July 16-31, 1920, appears the following:

NOTICE

Contagious epizootic typhus or rinderpest has just appeared in the country.

This affection is eminently contagious and deadly. The present epizootic causes a particularly grave situation, being of a nature to decimate rapidly the cattle herds of the nation.

It is therefore indispensable that each one give his active and earnest aid to the struggle undertaken for stamping out the epizootic and preventing the return of the scourge.

With this object in view the veterinary service must enforce a rigorous observance of the sanitary measures prescribed by the royal decrees of December 20, 1883, and August 3, 1920, and the ministerial decrees of December 22, 1883.

Disinfection must be the object of special attention of the veterinary service and must be strictly carried out. The registered veterinarians will notify their clients that as soon as the existence or suspicion of the disease is determined the proprietor of the infected premises must provide a large quantity of freshly slaked lime so that it may be immediately and abundantly utilized as a disinfectant.

Special attention must likewise be given to the movement of domestic animals and poultry, and especially of ruminants and swine, the movement of which for slaughter must be covered by a sanitary certificate. This certificate is individual and absolutely indispensable. For each certificate issued a stub in the prescribed form will be retained by the veterinarian.

The issuance of a certificate for a bovine animal which has not reached the age for slaughter (four teeth for females and two teeth for males) is strictly forbidden.

Articles 2 and 5 of the regulations of August 3, 1920, are susceptible of divergent interpretations. The provisions of these articles should be applied as follows: Within a radius of 1,000 meters of an infected place, all movement of ruminants, swine, dogs, cats and poultry is prohibited. Beyond this radius of 1,000 meters the movement of bovine animals for purposes of work is allowed, and ruminants intended for immediate slaughter, when covered by a sanitary certificate in the prescribed form, may be moved to public abattoirs, private slaughterhouses or public markets. Bovine animals, sheep and goats may likewise move a single time in order to go from the stable to the pasture, where they will remain after having arrived there. The free movement of these animals is forbidden by the provisions of paragraph 1 of article 2 of the royal

decree of August 3, 1920. They must therefore remain either at the stable or at the pasture.

The attention of the veterinary service is particularly called to the necessity of burying on the spot the carcasses of animals affected with bovine plague, as well as the offal of animals slaughtered as suspected of contamination, since the removal of these carcasses or their offal constitutes a grave danger of the dissemination of the virus and the propagation of the contagious disease.

LIVE STOCK BREEDS IN THE UNITED STATES

The U. S. Bureau of Crop Estimates took a rough census of the livestock of the country, classified according to breeds, a short time ago. The census brought out the following facts: Cattle, Shorthorns, 15,420,000, or 22.6 per cent; Herefords, 14,302,000, or 21 per cent; Holsteins, 11,069,000, or 16.2 per cent; Jerseys, 9,554,000, or 14 per cent; nondescripts, 7,044,000, or 10.3 per cent; with Angus, Red Polls, Polled Shorthorns, Guernseys, Galloways, Ayrshires, Brown Swiss, Devons, and Dutch Belted in gradually diminishing percentages.

Among the hogs, Duroc-Jerseys lead with 24,914,000, or 34 per cent; Poland Chinas with 20,308,000, or 27.9 per cent; Chester Whites, 7,788,000, or 10.7 per cent; Berkshires, 6,719,000, or 9.2 per cent; nondescript, 4,061,000, or 5.6 per cent; razorbacks, 3,061,000, or 4.2 per cent; with Hampshires, Tamworths, Yorkshires, and Cheshires in gradually diminishing numbers.

Among the sheep, Merinos lead with 12,364,000, or 25 per cent; Shropshires follow with 11,253,000, or 23.2 per cent; Rambouillets, 6,455,000, or 13.3 per cent; nondescripts, 3,941,000, or 8.1 per cent; Cotswolds, 3,504,000, or 7.2 per cent; Southdowns, 2,984,000, or 6.1 per cent; Hampshires, 2,968,000, or 6.1 per cent, with Oxforddowns, Dorsets, Cheviots in decreasing percentages.

While these figures are not exact, they tend to give a fair idea of the popularity of the different breeds and grades.—K. C. S. Ry. *Agricultural and Industrial Bulletin.*

The Outlook tells of a health campaign in Lee County, Mississippi, in which prizes were offered for health slogans contributed by school children. The first prize was won by this: "Chew your food; you have no gizzard." Fifteen hundred mile posts bearing this and other useful health precepts were erected by enterprising merchants throughout the county.

ABSTRACTS

THE BACTERIOLOGICAL CHARACTERISTICS OF TUBERCLE BACILLI FROM
DIFFERENT KINDS OF HUMAN TUBERCULOSIS. A. Stanley Griffith.
Jour. Compar. Path. and Bact., vol 23 (1920), No. 2, pp.
129-152.

The author states that the main objects of the investigations were (1) to determine by the examination of unselected series of cases the relative proportions of the human and the bovine types of tubercle bacilli in different kinds of human tuberculosis; and (2) to ascertain the frequency of occurrence and the distribution in the human body of variant strains of tubercle bacilli.

It is noteworthy that attenuated strains of tubercle bacilli have been found only in what may be described as the external forms of tuberculosis, *i. e.*, in cervical gland tuberculosis, in a thigh abscess, and in the skin tuberculosis. Of the two forms of tuberculosis affecting the skin which have been examined, lupus has yielded a higher proportion of attenuated strains than scrofuloderma. Since lupus is the most superficial of the various kinds of tuberculosis which have yielded attenuated tubercle bacilli, there is evidently close relationship between attenuation of tubercle bacilli and nearness of the tuberculous lesion to the surface of the body.

The total number of cases of human tuberculosis now investigated in Great Britain by identical methods and reported on, is 1,068, as follows:

Age Periods	Num- ber of Cases	Types of Infection						Per- centage of Bovine Infec- tion
		Standard Types			Atypical			
		Human	Bovine	Mix- tures (Human and Bovine)	In Cul- tural Char- acter- istics	In Virulence		
						Human	Human		Bovine
0 to 5 years.....	221	133	76	2	2	3	5	37.55
5 to 10 years....	312	208	81	1	5	7	10	29.45
10 to 16 years..	150	119	17	--	6	3	5	14.66
16 and upwards	384	342	20	2	8	10	2	6.25
Total	1068*	803*	194	5	21	23	22	20.7

*Including one case the age of which was not stated.

CONTRIBUTION TO THE KNOWLEDGE OF BIRD POX, WITH SPECIAL REFERENCE TO ITS RELATIONSHIP TO BIRD DIPHTHERIA, STOMATITIS PUSTULOSA CONTAGIOSA EQI AND VACCINIA. I. Van Heelsbergen. *Centralbl. f. Bakt. I. Abt. Orig.*, vol. 84 (1920), No. 4, p. 288.

The author formulates the following conclusions:

1. The great majority of cases of hen diphtheria are caused by the bird pox virus.
2. It is quite possible that the micrococcus of Bordet & Fally is the cause of bird pox.
3. The existence of an independent bird diphtheria with a specific cause (e. g. the bacillus of Klebs-Loeffler) cannot yet be denied.
4. Bird pox virus is not only filterable through a Berkfeld candle, but the Chamberland B and F filters may also allow the virus to pass through.
5. The bird pox virus is apparently phylogenetically closely related to the virus of stomatitis pustulosa contagiosa of the horse.
6. If it is not yet established that the vaccine virus is identical with bird pox, there is a very close relationship between them.

In support of these assertions the following facts are cited:

- (a) Both viruses possess an affinity for the skin. (b) A local process causes a general immunity with both. (c) Both viruses agree with regard to their preservation in glycerine. (d) Both viruses are similar morphologically. (e) Both viruses possess the same susceptibility to rabbit gall. (f) One can produce pox in mammals with bird pox virus. (g) Pox in hens may be produced with vaccine virus. (h) A pustular stomatitis in horses may be produced with both bird pox virus and vaccine virus. (i) One can produce a local immunity against bird pox in hens with vaccine virus (j) Rabbit passage increases the virulence of bird pox for the calf, just as it does in the case of vaccine virus. (k) Pox in children may be produced with the virus of contagious pustular stomatitis of the horse. (l) The cell inclusions found in bird pox agree with those which are produced by vaccine virus. (m) With the virus of the pigeon, there can be produced in the hen pox eruptions which agree completely with those produced in this species of animal by the vaccine virus.

L. T. GILTNER.

AFRICAN ABORIGINAL THERAPY. P. A. E. Sheppard. *American Journal of Public Health* (1920), p. 227.

The following incident was observed by the author: On inspecting the possessions, including the cattle, of a worthy young chief of the Zulu tribe, the following remarkable feat was performed

while milking a savage cow that kicked over Kaffir after Kaffir in succession the moment they attempted to milk her. The young chief, however, walked boldly up and seizing the cow's hind foot with both hands, dragged it out behind her, holding it firmly in spite of her struggles, until he succeeded in resting her hoof on his shoulder, when the frantic cow became quiet, and stood still to be milked by him, giving no further trouble. What really happened, was in my judgment, a subluxation either in lumbo-sacral or sacro-iliac region, or both, and an impingement of nerves of sufficient pressure to prevent pain or induce numbness of temporary duration, so that the animal either did not feel the milking or the unpleasantness caused by milking was removed.

W. N. BERG.

INFECTIOUS ABORTION IN SWINE. M. Schlegel. *Zeitschr. f. Infektionskrank. d. Haust.*, vol. 19 (1918), p. 332.

In one district for some years abortion had occurred in sows as frequently as in cattle. The swine aborted most often between the twelfth and fifteenth weeks of pregnancy, they also aborted between the sixth and eighth weeks. The symptoms manifested themselves in diarrhea and suppressed appetite for two or three days; then there appeared edema of the udder similar to that occurring at normal birth. The sows remained lying down much of the time, and aborted after an illness of two or three days. Other sows aborted suddenly without previous symptoms. Usually after surviving the abortion, the sows again became lively and soon recovered. Later the swine bred again and farrowed normal litters. Other sows were sold for slaughter on account of coming in heat every three weeks and not conceiving. The anatomical findings in the fetuses consisted of a seroedematous infiltration of the subcutis in the region of the navel, chest and throat. In the abdominal and thoracic cavities, as well as in the pericardial sac, there was a considerable quantity of reddish cloudy fluid. The liver was swollen and icteric, the spleen and lymph glands enlarged, and the blood watery. In the liver of the fetuses the abortion bacillus could be demonstrated in quite large numbers. Thus the Bang bacillus is established as the cause of infectious abortion not only of cattle, but also of swine.

L. T. GILTNER.

ARMY VETERINARY SERVICE

APPOINTMENTS IN THE VETERINARY CORPS

Examinations for the appointment in the Regular Army of veterinarians who served during the World War were held throughout the United States and Overseas Forces, the last of July. There were eighty-nine vacancies in the Veterinary Corps, Regular Army, on July 1, to be filled by the appointment of emergency veterinary officers who successfully completed the examinations held in July.

The War Department announced that no officer would be appointed in the Regular Army in a grade higher than the grade he held during the World War. The Act of June 4 also placed the minimum age limit of thirty-six years on men to be majors in the Regular Army.

There were eighty-seven successful candidates for appointment in the Veterinary Corps; of these appointees two have to date declined their commissions.

There are now fifteen vacancies in the grade of second lieutenant in the Veterinary Corps.

Veterinary Officers Recently Appointed Under the Act of Congress, June 4th, 1920

NAME	RANK	COLLEGE GRADUATED FROM	STATION ASSIGNED
Behney, Jacob Edw.	Capt.	Geo. Wash. U., 1913 U. of P., 1914	U. S. D. B., Ft. Leavenworth, Kans.
Cheely, Edw. I.	Capt.	Wash. State C., 1910	R. D., Ft. Bliss, Tex.
Crawford, Nathan N.	Capt.	Ia. State Coll., 1909	R. D., Ft. Robinson, Nebr
Derrick, Jesse D.	Capt.	U. of P., 1916	3rd Div., C. Pike, Ark.
Eakins, Horace S.	Capt.	Colo. Agri. Coll., 1911	1819 W. 39th St., Chicago, Ill.
Egan, Harold E.	Capt.	Ohio State U., 1911	Ft. Sam Houston, Tex.
Gladish, Isaac O.	Capt.	Ind. V. C., 1915	1st Div., Camp Dix, N. J.
Harsh, Forrest R.	Capt.	Ala. Poly. Inst., 1910	Camp Furlong, N. M.
Hodge, Joseph E.	Capt.	Geo. Wash. U., 1912	Camp Benning, Ga.
Howe, Harry H.	Capt.	U. of P., 1909	R. D., Camp Grant, Ill.
Kelser, Raymond A.	Capt.	Geo. Wash. U., 1914	5th Div., Camp Gordon, Ga.
Mahaffy, James R.	Capt.	U. of P., 1896	Camp Travis, Tex.
Moon, Joseph G.	Capt.	U. of P., 1916	Declined appointment
Perkins, Clell B.	Capt.	Ohio State U., 1912	R. D., Camp Travis, Tex.
Underwood, Jean R.	Capt.	Ia. State Coll., 1909	Camp Knox, Ky.
Whitney, Clifford C.	Capt.	Geo. Wash. U., 1914 U. of P., 1915	Army Medical School, Wash., D. C.
Austin, Francis M.	1st Lt.	Grand Rapids V. C., 1915	American Forces, Germany
Beeman, Howard N.	1st Lt.	Ohio State U., 1913	Camp Sherman, Ohio
Breen, Thomas A.	1st Lt.	McKillop V. C., 1908	R. D., Camp Dix, N. J.
Bridges, Burlin C.	1st Lt.	C. V. C., 1915	Camp S. D. Little, Ariz.
Brown, Lloyd J.	1st Lt.	K. C. V. C., 1910	6th Div., Camp Grant, Ill.
Buffin, Kenneth E.	1st Lt.	Geo. Wash. U., 1916	Q. M. D., San Antonio, Tex.
Carroll, Thomas E.	1st Lt.	U. of Calif., 1899	Camp Bragg, N. C.
Cook, Chauncey E.	1st Lt.	Ohio State U., 1909	R. D., Front Royal, Va.
Cowherd, Charles M.	1st Lt.	K. C. V. C., 1912	Q. M. D., St. Louis, Mo.
Crosby, Joseph F.	1st Lt.	Cornell, 1915	Ft. Snelling, Minn.
Dildine, Seth C.	1st Lt.	Ohio State U., 1917	Q. M. D., Baltimore, Md.
Dixon, Oress H., Jr.	1st Lt.	Ia. State Coll. 1915	P. D., Manila, P. I.
Dodsworth, Wm. E.	1st Lt.	Colo. Agri. Coll., 1915	Mercedes, Tex.

NAME	RANK	COLLEGE GRADUATED FROM	STATION ASSIGNED
Gerety, Joseph P.	1st Lt.	U. of P., 1910	Ft. Clark, Tex.
Grover, Sawyer A.	1st Lt.	K. C. V. C., 1914	Ft. Oglethorpe, Ga.
		McKillip V. C., 1915	
Guilfoyle, Calvert T.	1st Lt.	U. of P., 1911	Ft. Jay, N. Y.
Hershberger, Frank C.	1st Lt.	K. C. V. C., 1913	Marfa, Tex.
Johnson, Homer	1st Lt.	C. V. C., 1912	Eagle Pass, Tex.
Kunnecke, Robert P.	1st Lt.	Ind. V. C., 1913	Camp Lewis, Wash.
Lovell, Raymond I.	1st Lt.	Ohio State U., 1914	8th Cav., Camp Ft. Bliss, Tex.
Loy, Martin D.	1st Lt.	C. V. C., 1911	Q. M. D., Washington, D. C.
McConeghy, John K.	1st Lt.	Penn. S. Coll., 1915	Ft. Keogh, Mont.
		McKillip V. C., 1917	
Miller, Charles L.	1st Lt.	K. C. V. C., 1911	Camp R. L. Michie, Tex.
Miner, John W.	1st Lt.	Ia. State Coll., 1917	American Forces, Germany
O'Grady, Albert J.	1st Lt.	McKillip V. C., 1913	2nd Div., Camp Travis, Tex.
Pickering, Clifford E.	1st Lt.	Wash. State Coll., 1909	16th Cav., Ft. Sam Houston, Tex.
Pollard, Irby R.	1st Lt.	Ala. Poly. Inst., 1915	Ft. Riley, Kansas
Ramsey, Mott	1st Lt.	McKillip V. C., 1916	Q. M. D., San Antonio, Tex.
Randall, Raymond	1st Lt.	U. S. C. of V. S., 1917	7th Div., Camp Funston, Kans.
Reynolds, Francois H. K.	1st Lt.	Geo. Wash. U., 1914	Dept. Lab., Ft. S. Houston, Tex.
Riedel, Philip H.	1st Lt.	Ind. V. C., 1911	Q. M. D., Boston, Mass.
Savage, Howard M.	1st Lt.	Geo. Wash. U., 1917	Z. T. O., Washington, D. C.
Schreck, Harold F.	1st Lt.	Ohio State U., 1917	5th Div., Camp Gordon, Ga.
Seaver, George H.	1st Lt.	K. C. V. C., 1914	R. D., Camp Funston, Kans.
Shinn, Fred W.	1st Lt.	Ia. State Coll., 1914	Q. M. D., Omaha, Nebr.
Siereveld, Max, Jr.	1st Lt.	Cinn. V. C., 1909	Camp Eustis, Va.
Smock, Stanley C.	1st Lt.	K. C. V. C., 1917	Ft. Apache, Ariz.
Steinkolk, Frank B.	1st Lt.	Cinn. V. C., 1917	Ft. Sill, Okla.
Stewart, Ralph B.	1st Lt.	St. Jos. V. C., 1916	Ft. Leavenworth, Kans.
Stiffer, John R.	1st Lt.	U. S. C. of V. S., 1911	Declined appointment
Waters, Fred C.	1st Lt.	Ohio State U., 1912	Fitzsimons, G. H., Denver, Colo.
Williams, Charles S.	1st Lt.	Ohio State U., 1912	83rd F. A., Camp Knox, Ky.
Williamson, Wallace L.	1st Lt.	Ohio State U., 1915	Ft. D. A. Russell, Wyo.
Wolfe, William R.	1st Lt.	K. C. V. C., 1917	R. D., Camp Pike, Ark.
Worthington, Josiah W.	1st Lt.	K. S. A. C., 1917	Hawaiian Department, Hawaii
Barringer, J. Lew	2nd Lt.	Cornell, 1916	Q. M. D., New York City, N. Y.
Beck, Oscar G.	2nd Lt.	C. V. C., 1911	Camp Meade, Md.
Carpenter, Peter T.	2nd Lt.	C. V. C., 1915	R. D., Camp Funston, Kans.
Clark, Samuel W.	2nd Lt.	C. V. C., 1912	Q. M. D., San Antonio, Tex.
Cox, Claude F.	2nd Lt.	C. V. C., 1913	Q. M. D., Ft. Mason, Calif.
Dornblaser, Joseph H.	2nd Lt.	McKillip V. C., 1917	Ft. Riley, Kans.
Fitzgerald, Gerald W.	2nd Lt.	K. S. A. C., 1916	R. D., Ft. Bliss, Tex.
Friedline, Lloyd M.	2nd Lt.	Ind. V. C., 1917	6th Div., Camp Grant, Ill.
Hudgins, Patrick H.	2nd Lt.	Ont. V. C., 1910	Ft. D. A. Russell, Wyo.
		Toronto U., 1910	
Hughes, Wm. O.	2nd Lt.	Ind. V. C., 1913	R. D., Camp Gordon, Ga.
Ingram, Lester W.	2nd Lt.	Colo. Agri. Coll., 1917	R. D., Camp Travis, Tex.
Jones, Gardiner, B.	2nd Lt.	K. C. V. C., 1916	Q. M. D., Chicago, Ill.
Kielsmeier, Samuel G.	2nd Lt.	C. V. C., 1916	Marfa, Tex.
Long, Earl F.	2nd Lt.	Ohio State U., 1910	Camp Stanley, Tex.
Ludwigs, John R.	2nd Lt.	K. C. V. C., 1916	4th Div., Camp Lewis, Wash.
Martin, Floyd G.	2nd Lt.	C. V. C., 1915	3rd Div., Camp Pike, Ark.
Moore, Herbert K.	2nd Lt.	K. C. V. C., 1916	Aberdeen Proving Ground, Md.
Noonan, James E.	2nd Lt.	U. of Toronto, 1911	A. S. B., Norfolk, Va.
		Ontario V. C., 1911	
Pringle, Walter R.	2nd Lt.	St. Jos. V. C., 1917	Q. M. D., San Antonio, Tex.
Rogers, Edwin K.	2nd Lt.	Wash State Coll., 1916	R. D., Ft. Robinson, Nebr.
Schwalm, Oscar C.	2nd Lt.	Grand Rapids V. C., 1917	Camp Sam Fordyce, Tex.
Seymour, Raymond T.	2nd Lt.	K. C. V. C., 1915	2nd Div., Camp Travis, Tex.
Shannon, Russell S.	2nd Lt.	C. V. C., 1913	Hawaiian Dept., Hawaii
Skinner, Charles B.	2nd Lt.	Cornell, 1914	Raritan Arsenal, N. J.
Van Tuyl, Harry Edw.	2nd Lt.	K. C. V. C., 1917	Ft. Myer, Va.
Watson, Harry L.	2nd Lt.	Grand Rapids V. C., 1916	R. D., Camp Gordon, Ga.

APPOINTMENTS IN THE RESERVE CORPS

The law of June 4, 1920, limits appointments in the Reserve Corps to a grade not higher than that held by the person while in the military service. Another provision of that law authorizes the promotion, under such rules and regulations as the Secretary of War prescribed, of Reserve Officers after one year's service.

The board or committee appointed in compliance with the above-mentioned law to devise a plan of organization of the Reserve Corps is now in session in Washington. Among other things to be accomplished by this board will be the drawing up of regulations governing such promotions.

This information is of importance in view of the fact that there have been of late many declinations of commissions in the Reserve Corps on account of the inability of the applicant to receive a higher grade than that held during the war.

STALLION FIGURES

According to a compilation for 14 States having stallion registration laws, following is the relative proportion of purebred, grade, crossbred and mongrel stallions:

Purebred stallions.....	27,694
Grade stallions.....	12,734
Crossbred stallions.....	9
Nonstandardbred stallions.....	71
Mongrel stallions.....	2,915
Total.....	43,423

The States represented by these figures are California, Idaho, Iowa, Indiana, Kansas, Minnesota, Montana, New York, North Dakota, Oregon, Pennsylvania, South Dakota, Utah and Wisconsin.

Dr. C. B. Robinson, contract veterinarian of the District of Columbia, states in his recent annual report that the District government has in use 703 horses and mules, an increase of 22 over the preceding year. Nearly half are in the street cleaning department.

Topeka *Daily Capital* (August 22) notes that 300 head of cattle have died of anthrax in the recent epizootic in the vicinity of Collinsville and Claremont, Okla.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-seventh Annual Meeting, Columbus,
Ohio, August 23 to 27, 1920

(Continued from the October JOURNAL)

GENERAL SESSION

TUESDAY AFTERNOON, AUGUST 24, 1920

THE meeting convened at 2:30 p. m., President C. A. Cary presiding.

REPORT OF EXECUTIVE BOARD

THE PRESIDENT: The first thing in order is the report of the Executive Board.

(Secretary Mayo read the list of applications for membership, and it was voted, on motion, duly seconded, that the recommendations be received and approved, and that the Secretary, under suspension of the rules, be authorized to cast an affirmative ballot for all the names read.)

SECRETARY MAYO: The Executive Board recommends that the rules be suspended and that Horace B. Allen be elected to membership.

(It was voted, on motion of Dr. W. H. Hoskins, seconded by Dr. Kinsley, that the recommendation of the Executive Board be approved and Dr. Allen elected.)

SECRETARY MAYO: The Executive Board recommends also that Dr. Crespo, of Cuba, be elected under suspension of the rules.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Hoskins, that the recommendation of the Executive Board be approved and Dr. Crespo elected.)

SECRETARY MAYO: The Executive Board also recommends that the rules be suspended and that Dr. de Souza of Brazil be elected to active membership in the Association.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Hollingworth, that the rules be suspended and that Dr. de Souza be elected.)

SECRETARY MAYO: The following applications have been unfavorably reported by the Executive Board: John R. Scully, W. H. Lynch, and C. W. Anderson.

(It was voted, on motion of Dr. Kinsley, seconded by Dr. Glover, that the recommendation of the Executive Board be approved.)

ELECTION OF OFFICERS

THE PRESIDENT: According to the Constitution and By-Laws and the order of business, the election of officers comes up at this time. Let me say a few words about this before we begin to nominate, so that you will not be under any misunderstanding. The Constitution says: "Nominations shall be made from the floor, and nominating speeches shall not take up more than two minutes' time." Therefore I hope all of you who are interested will regulate yourselves accordingly, as to time especially.

First in order is the election of a President for next year. Nominations are now in order.

MAJOR GOULD: I know a man who needs no speech, Dr. David White of Ohio. (Applause.)

DR. MERILLAT: I want to second that nomination. I want to see a man of the proper size for President during this ensuing year, a man who is able to carry this Association through this year that is coming. I say this without any disparagement of the virtues or capabilities of those who may be nominated hereafter.

David White of Ohio is a pioneer of the veterinary profession. No one knows like Ohio men how he brought the turbulent State of Ohio to good order, from charlatanism to a State that makes every State in the Union proud of Ohio, by building up from this chaos the greatest organization in the State; how he went to the war, without any thought of what influence it might have on his position; went through the Army and made good. As an Army man I second his nomination, because in France, when the Veterinary Corps was in bad state through lack of organization, David White showed his bigness by setting things right in a few weeks and putting us on a plane that made the Veterinary Corps function in better condition.

Gentlemen, I speak to you strictly as a member of the American Veterinary Medical Association who wants to see the right support of David White of Ohio. (Applause.)

DR. ADAMS: Mr. President, I wish also to second the nomination of Dr. David S. White, and in seconding that nomination I do not have in mind the individual man, but really I am thinking of what I believe to be the welfare of this Association, and that is what I think we all are thinking of. This Association is a big institution, and the standing of every veterinarian in this country depends largely upon the stand taken by this institution.

I was very sorry, before I came into this room, to hear one note of discord spoken. It was well meant, but if we should follow out the line of argument that I heard we would soon be setting one faction up and another faction up, and working faction against faction. We would have practitioners lining up against school men and the Bureau of Animal Industry men. Let's keep those things out of our minds for all time.

When we think of a man let us not think of him in any particular sphere of work, but let us try to recognize the type, the educated man, who knows what advances veterinary medicine has made the world over, who is in a position to lead us to the front if we are behind; a man who knows the status of veterinary medicine in countries where it has had a hundred years' advance of us—Germany and France; a man who knows what they are doing there, and knows what we should be doing here.

We want a man of whom we can be proud when he comes up against the best educated physicians of this country, who will be recognized not only as an educated gentleman but as a scientist. That is the type we are after, and whenever we nominate such a type, if he is one of our men, let's get behind him, no matter what school or what section he comes from. David S. White, in my opinion—and I have known him thirty years—is the type, and therefore I take pleasure in seconding his nomination. (Prolonged applause.)

DR. JACOB: I think that I voice a most popular sentiment from the South when I second the nomination of Dr. David S. White. (Applause.)

DR. CONNAWAY: Missouri expects to help elect an Ohioan for President—of the United States (laughter and applause), and in conformity with this plan of things I think that every veterinarian in the State of Missouri would be pleased to have an Ohioan as the President of the American Veterinary Medical Association. (Applause.)

DR. DUNPHY: Mr. President, I take off my hat to no man in this Association in honor and respect of Dr. David White of Ohio, but there are times in our lives when we feel that merit and work in this Association or any Association should have its reward. I wish to present the name of a man who has been connected with this Association for over thirty years. His influence has helped in the veterinary profession not only from Florida to Michigan, not only from Maine to California, but over the entire American continent. He has been an instructor, a teacher, and he has been a practitioner all of his life.

The good State of Ohio has been honored this year as no State in the Union. There are three candidates from this State for President of the United States. It has also been honored with the meeting of the American Veterinary Medical Association, the largest institution of its kind in the world, and it looks to me that when they have been given the whole world, you might say, it isn't necessary for us to put a little red fence around it for them. I think a State that has been honored with those four things that I have mentioned—three men as candidates for President of the United States and the honor of entertaining the American Veterinary Medical Association—when a State that has had that much honor, that honor alone should live in men's memories for scores of years, and even be handed down to posterity until the crack of doom. I don't believe it is sportsmanlike for men to lick the earth. As an old sportsman,

when I was out shooting birds and I got what I thought was fair and right, I stopped and went home; and I don't believe it is sportsmanlike for Ohio to want any more than she has been honored.

I want to present the name of A. H. Baker, not of Chicago, not of Illinois, but Dr. A. H. Baker of America. (Applause.)

DR. SIGLER: I take pleasure in seconding the nomination of Dr. Baker.

DR. WELCH: Coming from his home State, knowing him intimately as I have for thirty years, as a man, as a teacher, and as a zealous worker, both in his home State association and in the American Veterinary Medical Association, during all of that time, I take pleasure in seconding the nomination of Dr. A. H. Baker. (Applause.)

DR. L. E. BROWN: I want to second the nomination of Dr. A. H. Baker for President. I think it is due him. He is in the prime of life, and he will be a little further along. He has a great many claims on this Association that I think should be honored. (Applause.)

THE PRESIDENT: Are there any further nominations? If not, a motion to close the nominations is in order.

(It was voted, on motion of Dr. W. E. Wight, of Pittsburgh, duly seconded, that the nominations be closed.)

THE PRESIDENT: We will vote by ballot, and only those who have been recently elected and those who have paid their dues for 1919 are entitled to vote. I will appoint Dr. Kinsley, Dr. Dunphy, Dr. Reichel, and Dr. Lambert as tellers.

(The vote was taken, and the tellers retired to count the ballots.)

THE PRESIDENT: While the tellers are out, we have five Vice-Presidents to elect. I want to call your attention to one feature we have overlooked. You can elect all the men from one district that you want to, but I have had a number of complaints about the fact that the separate districts were not represented. These complaints, coming from the rank and file, should be heard, notwithstanding the fact that the Constitution and By-Laws give you the opportunity to do otherwise. I want to give you an opportunity to elect one at a time. You can all vote on them. I think that is fair. I think the rank and file of the men in these districts have a right to ask you to do that. If you don't want to do that, it is your privilege. I am going to present it to you because it has been presented to me. You came up here and elected them all from these areas, and didn't give these districts a chance. You can do just as you like. I leave it to you.

DR. HILTON: Mr. President, I take great pleasure in nominating Dr. A. A. Etienne, of Montreal, Canada.

DR. J. B. HOLLINGSWORTH: I take much pleasure in seconding that nomination.

DR. DE VINE: I nominate A. O. Longley, of San Francisco, California. Dr. Longley is not here, but many of you know that he has

been working here for a quarter of a century. He has also done service in the war. Dr. Longley is one of the finest men, and those of you who know him, know him as one of the grandest men in the profession. Therefore I hope he may receive your support.

DR. COTTON: I want to second Dr. Longley's nomination.

DR. LAMBERT: In seconding the nomination of Dr. Longley I wish to say a word. It was my privilege in the Army to room with Dr. Longley. It will be recalled by you that Dr. Longley started the movement to add 400 members to the membership of the American Veterinary Medical Association. In other words, he started, single handed, a movement that increased our membership more than 10 per cent. A great many of the men here today are men that Dr. Longley started in. He is neither an old man nor a young man. I appeal to you to support Dr. Longley. (Applause.)

DR. MCAUSLIN: I wish to present to this Association the name of a Vice-President not representative of any particular section. He represents the United States Army, and I offer for reelection the name of John N. Gould.

DR. L. T. REEFER: West Virginia has never been recognized in the American Veterinary Medical Association. I desire to place in nomination the name of J. J. Cranwell, of Clarksburg, West Virginia. (Applause.)

(The nomination of Dr. Cranwell was seconded.)

DR. T. E. ROBINSON: I place in nomination the name of Dr. T. A. Sigler, of Greencastle, Indiana.

DR. JOHN BLATTENBERG: I second Dr. Sigler's nomination.

DR. JOHN I. HANDLEY: I would like to place in nomination the name of Dr. Herbert Lothe, of Wisconsin.

DR. F. P. CAUGHMAN: I would like to place in nomination the name of a gentleman who is probably one of the oldest practitioners in America today. He has been a practitioner for twenty years and quite active in the affairs of the American Veterinary Medical Association. I place in nomination the name of Dr. Benjamin McInnes, Charleston, South Carolina.

DR. O. H. ELIASON: I wish to second the nomination of Dr. Lothe, of Wisconsin.

DR. W. H. HOSKINS: Mr. President, there is a man in our organization who has been of great service. He has made the world his debtor. I therefore place in nomination the name of Adolph Eichhorn for Vice-President.

DR. EICHHORN: I have served for two successive terms, and I think somebody else ought to take my place. I place in nomination Dr. T. A. Burnett, whose efforts for the success of this meeting have been great.

DR. BURNETT: I am not a young veterinarian, but I am a young member of the American Veterinary Medical Association. I think there are a good many older men among whom the honor should be distributed.

DR. GLOVER: Mr. President, I wish to nominate Dr. Charles G. Lamb, State Veterinarian of Colorado. (Applause.)

(It was voted, on motion duly seconded, that the nominations for Vice-President be closed.)

THE PRESIDENT: I will appoint Dr. Lambert, Dr. Day, Dr. Hoskins, Jr., and Dr. Simms as tellers.

The Secretary informs me that a motion has been required heretofore to determine the results of the election, and that motion has included this, that the one receiving the highest number of votes would be regarded as First Vice-President, the second highest Second Vice-President, and so on. A motion to that effect will be in order.

DR. J. PAYNE LOWE: In order to facilitate matters, I so move. (The motion was seconded and carried.)

THE PRESIDENT: The tellers for President are now ready to report. The Secretary will read the results.

SECRETARY MAYO: Total number of votes cast, 448. Dr. White, 325; Dr. Baker, 123.

THE PRESIDENT: Dr. White having received the majority of votes cast, I hereby declare him elected President for the ensuing year.

(The vote was taken for Vice-President and the tellers retired to count the ballots.)

THE PRESIDENT: Nominations for Treasurer are now in order.

DR. S. F. MUSSELMAN: I wish to place in nomination for Treasurer the name of Dr. M. Jacob.

DR. BURNETT: I second that nomination.

(It was voted, on motion of Dr. Caughman, duly seconded, that the nominations for Treasurer be closed.)

DR. MCAUSLIN: I move the rules be suspended and the Secretary be instructed to cast one vote for Dr. Jacob as Treasurer.

(The motion was seconded and carried. The Secretary cast the ballot as instructed, and Dr. Jacob was declared elected Treasurer of the Association. (Prolonged applause.)

PLACE FOR NEXT MEETING

THE PRESIDENT: According to the motion yesterday, the selection of the next place of meeting was the next order of today. The organization or the house has the right to select the next meeting place or leave it to the Executive Board. We are now ready for that question.

SECRETARY MAYO: Mr. President, as Secretary, I have received an invitation from the Chamber of Commerce, or some official organization, of New York City. I have also received the following letter: (Dr. Mayo read an invitation from the Des Moines Convention Bureau.)

DR. GLOVER: Mr. President and gentlemen, out West there was a cowboy who went to a dance in a tipsy condition, and they threw him out. Soon he went back again and they threw him out again.

Finally he went back the third time, and then they threw him out the window. He sat there a while, rubbing his shins, and finally he looked up and said, "I know what's the matter with them fellers; they don't want me in there." (Laughter.) I have invited you to Colorado twice. If you turn me down the third time I shall conclude that you don't want to come to Colorado. (Laughter.)

I wish I had the eloquence to stir your souls like some of our noted orators, but unfortunately I can not. I am something like the young minister who had just graduated from a theological seminary and contemplated performing the marriage ceremony. He went over the ritual, always ending with this, "It is customary to kiss the bride." The day arrived, and he got through the ceremony all right. Finally, he said, "It is kisstomary to cuss the bride." (Laughter and applause.) Now if I get confused in my few words you will please pardon me, because I want to assure you that I am stirred in an unusual way. It is seldom that any audience affects my nerves, but this time I am nervous.

We want you in Colorado. I have in my pocket invitations from the Chamber of Commerce of the city of Colorado Springs and the Mayor of Colorado Springs, and the unanimous vote of the Colorado Veterinary Medical Association.

You have overlooked our district. You have gone over the mountains twice. You have been to New York City, Toronto on the north and New Orleans on the south. Why not come out to Colorado? That is the playground of the United States. Formerly it was a popular thing to go and see the Alps, to go across the water. Now the slogan is, "See America first."

I want you to come to Colorado Springs. Colorado Springs is right at the base of Pike's Peak. If any of you think it is hot out there, I want to tell you that two weeks ago we had a foot of snow on top of Pike's Peak. If you take a train to Denver and go over Moffat Pass, there you can reach out of the window and reach the snow banks. You can snowball, you can roll in the snow, you can eat snow, get all the snow you want. There are many side trips into the mountains. If you want to go fishing for speckled trout, there is the best kind of opportunity, and you never will want to fish for bass or sunfish out in the lake again. If you want to take a short trip above timberland, go to the top of Pike's Peak and back for lunch, or take an automobile round and round and round the mountain top, to the top of Pike's Peak. Then you can be back in time for lunch and the afternoon session.

One thing that will appeal to you is how much it won't cost. Mind you, there are special tourists' rates to Colorado next summer, so that the rates will be less next year than the ordinary passenger rates. Colorado Springs has six main railroad trunk lines. The purpose is to make the headquarters at the Antlers Hotel. Don't think for a moment you are going to be held up. Please get that notion out of your heads. I am here to tell you that the rates are

practically the same as in the Deshler. You can go to a cheaper place if you want to. If you want to pay more you can do so. You can pay eight or ten dollars and get all the style you want.

Colorado Springs is in the habit of entertaining. They have found it does not pay to overcharge tourists, because they want them to come back again. They will be fair with you. We have plenty of room. There is plenty of space in the hotel and elsewhere. There is nothing you can want out there that you can't get as well as in any other place in the United States. You are one mile nearer heaven out there, and that will do you no harm. (Laughter.)

Mr. President, I will leave it to you; is it not a fact, according to your observation, that whereas that country is from one to two miles nearer heaven, the people, being in close proximity to that future abode for the few, and hearing the clapping of angel wings and the heavenly chorus, have in a measure partaken of the angelic qualities of those inhabitants? (Laughter and applause.)

Come out there. It will do you good physically. It will do your soul good.

Mr. President, I would like to see this thing settled on the floor of the convention this afternoon, and not left to the Executive Board. Therefore, if it is in order, I would move you that if it is the sense of this meeting, we request the Executive Board to make arrangements for the next meeting in Colorado Springs, Colorado. (Seconded.)

DR. STANGE: Gentlemen, before the motion is put, I would like to say a few words in behalf of Des Moines, and before I get through I am going to tell you of the finest plan I ever heard of. I have here a letter from the Des Moines Chamber of Commerce.

(Dr. Stange read the letter, also a letter from the President of the Iowa State College.)

DR. STANGE: In addition, the Governor of the State has sent word that he would like very much to see the convention come to Iowa next year.

In addition to the great live-stock interests we have, we register in Iowa about 800 graduate veterinarians. I believe that is what we are interested in. I believe we are also interested in the great live-stock industry of this country, and I believe you will find if you come to Iowa that you are practically in the center of that great industry.

I know we would all enjoy a vacation to Colorado, and I am going to make the suggestion to you that you go to Des Moines and hold your meetings in the midst of the very things that we are most vitally interested in, and then we will all get on the train and go down to Colorado Springs.

So, Mr. President, I move an amendment to Dr. Glover's motion, that we meet in Des Moines and then all get on the train and go to Colorado Springs for a fine outing. (Applause.) (Seconded.)

DR. W. H. HOSKINS: Mr. President, I think I understood Dr. Stange to say that the Association had never met in Des Moines.

It did meet in Des Moines, and I will second Dr. Glover's motion that we go to "Pike's Peak or bust."

(The question was called for, a rising vote was taken, and the result was 96 for and 120 against Dr. Stange's amendment. So the amendment was lost.)

THE PRESIDENT: The question now comes on the original motion made by Dr. Glover that we go to Colorado Springs.

(It was voted, on motion of Dr. Glover, duly seconded, that the Executive Board arrange for the meeting next year in Colorado Springs, Colorado.)

NOTICE OF AMENDMENT TO BY-LAWS

THE PRESIDENT: The Secretary has some business on the desk.

SECRETARY MAYO: Notice is given by the Executive Board of an amendment to the Constitution and By-Laws. It is recommended that Section 1, Article 1, of the By-Laws be changed so far as the order of business is concerned, placing reports of officers ahead of election of officers, which is now number 6.

(It was voted, on motion, duly seconded, that the recommendation of the Executive Board take the usual course of lying over for a year before it comes up for adoption.)

PURCHASE OF PERMANENT HOME

DR. BENNETT: I move that the Executive Board, together with the President and the Secretary, be authorized to exercise their discretionary powers in the consideration of location and purchase of a permanent home for the Secretary, Editor and Business Manager, and for the storage of the records, books and archives of the Association. (Seconded.)

DR. W. H. HOSKINS: Won't that go over for one year?

THE PRESIDENT: This gives the committee power to take that up.

DR. W. H. HOSKINS: It means that the Board would spend a large sum of money. I don't think it would have the right to do that. I am not against that, but I think all the members should know the action before we vote on that.

THE PRESIDENT: The question is before you, and I see nothing in the Constitution and By-Laws prohibiting it.

DR. REICHEL: Is it understood that this carries the right to purchase?

THE PRESIDENT: Yes. They are the financial committee of the Association.

DR. W. H. HOSKINS: I move that that be laid over for one year. (Seconded by Dr. McAuslin.)

THE PRESIDENT: An amendment has been moved and seconded that this be laid over for one year.

DR. W. H. HOSKINS: My idea is that the members all ought to have notice of it. I move that we postpone it for one year and that

all members be given notice of this proposition. (Seconded by Dr. McAuslin.)

SECRETARY MAYO: I would like to ask for information. If this is published in the official JOURNAL of the Association, would that be satisfactory?

DR. W. H. HOSKINS: Yes, sir.

DR. COTTON: A point of information. Do I understand that this motion gives the Executive Committee power to purchase, or only to investigate and report to the Association?

THE PRESIDENT: It gives discretionary power to this Board to purchase or to investigate and report. They may purchase.

DR. MURPHEY: I don't see that there is any necessity for this to prevail. We have a democratic form of organization, in that we have representatives from different districts. They have been elected from different districts. If we didn't have confidence in them we would not have elected them. It seems to me it would be unfair with the arrangement of better business management to ask that the meeting not give the Executive Board power they ask to establish a permanent and satisfactory home and save the rent, and officially take care of the archives of the Association and the business of the Association. I see no reason for postponing this with the idea of bringing it back here and squabbling over it on the floor. This is a democratic organization and we have our representatives and we should trust them.

DR. MCAUSLIN: I would like to call Dr. Murphey's attention to the fact that this motion gives those people unlimited power, an unlimited amount of money to spend. Discretionary power doesn't mean anything when it comes to paying out hard cash. Postponing this matter for one year can't do any harm.

DR. JACOBS: Mr. President and gentlemen, I think this question of making a permanent home should be decided. As Treasurer of the Association I happen to know that it has been an expensive proposition to keep shifting the Association's property from one place to another. I think it ought to be permanently located. I look upon the Executive Board as men who have business ability, or they would not represent the Association. (Applause.)

DR. KOEN: I don't believe that we shall have another meeting when there will be a more representative attendance than there is here today, or when men will know better what they want to do than they do today. We have placed our confidence and our loyalty in the Executive Board, and I think it would be a reflection upon them to postpone action while a good and convenient place might be had. The sooner this question is decided the better it will be for the Association. I think we should vote down the amendment and give the committee the power and the authority we placed in their hands when we elected them. (Applause.)

DR. W. H. HOSKINS: You have had less than 500 of your members here today. You are going to vote, 500 of you, for 4,500,

without having given them the opportunity of investigating for themselves on the proposition, let alone the purchase. It is a fairly new proposition, unknown to seven-eighths of your membership, and it would not do any harm to let it lie over for one year. You may not be afraid to. It can come up at the next meeting.

DR. W. HERBERT LOWE: I have confidence in the committee, but we have done all these years without a home, and let that Executive Committee come back here and tell us what they think and let us vote on it then. We may be sorry if we get the wrong home.

DR. A. S. COOLEY: I wish to say that I have confidence in the Executive Committee upon this question, and believe this should come before this section.

DR. W. HERBERT LOWE: I have every confidence in the committee, and I am in favor of this Association having a permanent home; but I do think that we ought to know approximately what amount is anticipated to be spent for a home, and I don't think it is good business for us to vote and give this authorization without knowing approximately how much money they expect to spend for a home.

DR. CONNAWAY: I want to move a substitute for the original motion.

THE PRESIDENT: That would be in order after this amendment.

DR. CONNAWAY: Substitute that the Executive Committee be authorized to investigate the cost and the best location for a permanent home for this Association and report back to the Association at its next meeting.

THE PRESIDENT: That is practically equivalent to what the amendment will do.

DR. W. H. HOSKINS: I will accept the substitute.

(Dr. W. Herbert Lowe seconded Dr. Connaway's substitute.)

DR. CONNAWAY: The substitute is this: That we, as good business men, use our good sense during this coming year and investigate this matter thoroughly as to place and cost of establishing a permanent home for this work, and report back at our next meeting. (Applause.)

(The question was put to a standing vote and the result showed a total of 180 for and 52 against the substitute. Dr. Connaway's motion was carried.)

DR. STANGE: Inasmuch as I am retiring from the Executive Board after this meeting, I would like to say just a few words. I want to call your attention to this fact: You are going to ask for a survey, so to speak, during the next year. You are going to have a report at the next meeting. It will probably be acted upon. You are going to meet in Colorado Springs. Are you going to have a representative group from all over the United States to vote? Or are you going to have—as you have at most meetings—a certain area immediately around where you have the meeting, in the majority, and let them decide?

You people could very well and very easily locate the permanent home in the West if you so desired. I simply want to call your

attention to that fact. I want to say that on the Executive Board you have representatives from all districts, and my experience on the Executive Board has been that their ideas in all things are for the best of the Association.

I thought I ought to explain this to you, because I am not going to be on the Board, and I won't have anything to do with the investigation or anything of that kind; but you are taking action now for your survey, and then you are going to decide it in Colorado Springs. You ought to keep that in mind. You will vote for a permanent home while in Colorado Springs next year. Would you rather do that, or leave it to the Executive Board? For the benefit of the whole organization I wanted to make that explanation.

DR. R. C. MOORE: There are objections, undoubtedly, to all of these methods. It is very hard to arrive at any method. It seems to me that good business managers would demand that this Association know something about how much money is to be spent. The Board could obligate this Association to any sum, half a million dollars, if they want to, and I don't think that would be good business. I think we ought to get a good idea of what it is going to cost, and then get a maximum sum to be authorized and spent for this purpose.

DR. STANGE: If that is the desire of the Association, I suggest that this vote be taken by mail count.

DR. KINSLEY: As a member of the Executive Board, I will say this is a relatively new problem, and the Executive Board, I personally believe, would prefer time to think it over. In my judgment the best plan would be by a post-card vote after the Board has made its investigation. I believe it should be left in such a way that this does not need final action at the next meeting in Colorado Springs. I believe there ought to be a post-card vote from the entire Association before this home is selected. (Applause.)

THE PRESIDENT: Any other discussion on the original motion? If not, are you ready for the question as amended?

DR. KINSLEY: I should like to ask then, does the substitute require final action next year?

THE PRESIDENT: Not necessarily.

DR. STANGE: I move an amendment that the vote for final selection of a home be taken by mail ballot. Seconded by Dr. Kinsley.)

SECRETARY MAYO: Let me state to you briefly how this stands. As it is now, the Executive Board is to report at the next meeting of this Association in Colorado Springs, and that after that report, if there is a ballot taken, according to the proposed amendment of Dr. Stange, if that carries, then after the next meeting they will take a postal-card vote on the report of the Executive Board.

DR. MCAUSLIN: Mr. President, I would call the attention of the assembly to the fact that this does not call for definite action at Colorado Springs. The motion made says the Executive Committee

shall report, and it calls for no definite action at Colorado Springs. It has been so settled by this assemblage.

THE PRESIDENT: The amendment is in order, notwithstanding that, but doesn't qualify the substitute.

DR. MCAUSLIN: How so?

THE PRESIDENT: By stating a definite thing. I rule that the amendment is in order. Are you ready for the question?

DR. KINSLEY: I rise to a point of information. If the Board reports at Colorado Springs, unfavorably, it will not be necessary to have a post-card vote?

SECRETARY MAYO: Yes, it would. The purpose is to have the Executive Board report at Colorado Springs. If the Board decides to buy a place, it will be voted on. If they decide not to buy a place, that would be voted upon. This Committee is to investigate and report. They will report that they can get certain places, and certain locations, and so on. If the Association, according to the amendment proposed by Dr. Stange, wants to take the whole matter out of the Executive Board's hands and vote against the report of the Executive Board, they can do so. In other words, after the report of the Executive Board is made at the next meeting, every member of the Association will have an opportunity to vote on the report, either approving or disapproving, by postal card.

DR. MCAUSLIN: I want to call your attention to the fact that if we go to Colorado Springs and then turn around and go to Des Moines, then we will have the same situation, the local influence. Let's play fair.

DR. STANGE: That question, as I understand it, will not be decided at the meeting. That vote will be taken between the time you meet in Colorado Springs and the time of the next meeting, by postal card.

THE PRESIDENT: The question is on the amendment made by Dr. Stange.

(It was voted, on motion of Dr. Stange, duly seconded, that the vote on the selection of a permanent home be taken by mail ballot.)

THE PRESIDENT: Now the question is on the original motion, as amended, which now reads that the Executive Committee shall investigate this matter of a permanent home, and report, and when that report is made, there shall be taken, after the vote, or whatever action is taken at Colorado Springs, a mail vote on their action.

(The vote was taken on the original motion as amended, and the motion was carried.)

ELECTION OF VICE-PRESIDENTS

THE PRESIDENT: We will now call for the report of the tellers on the election of Vice-Presidents.

The Secretary read the report of the vote, which was as follows: Dr. Longley, 207; Dr. Etienne, 200; Dr. Gould, 167; Dr. Burnett, 160; Dr. Cranwell, 159. (Applause.)

THE PRESIDENT: You have heard the names and the number of votes received by each nominee. I now declare them elected Vice-Presidents in the order named, for the ensuing year.

TELEGRAM FROM SECRETARY OF AGRICULTURE

THE PRESIDENT: I have here a telegram from the Secretary of Agriculture at Washington: "Please extend to the members of your Association my hearty greetings and best wishes for a successful meeting at Columbus and express to them my regret that I can not arrange to be with them. This Department is deeply interested in the welfare of the veterinary profession and appreciates its importance in relation to agriculture and especially the live-stock industry of the country. If your next meeting is held in Iowa, I hope that I may have the pleasure of attending. (Signed) E. T. Meredith, Secretary." (Applause.)

SECRETARY MAYO: Mr. President, I think it would be very appropriate if this Association should send to Secretary Meredith a telegram of appreciation of the interest and support that he has given to the veterinary profession of America, not only as Secretary of Agriculture, but as a leader in the agricultural work of the country.

DR. W. HERBERT LOWE: Mr. President, I take great pleasure in seconding the motion made by our Secretary.

(It was voted that a telegram be sent to Secretary of Agriculture E. T. Meredith.)

Adjournment.

GENERAL SESSION

WEDNESDAY MORNING, AUGUST 25, 1920

The meeting convened at 10 a. m., President C. A. Cary presiding.

THE PRESIDENT: The first thing this morning will be announcements by the local committee about the banquet.

(Announcements by Dr. Lambert.)

REPORT OF EXECUTIVE BOARD

THE PRESIDENT: We will now go on with the report of the Executive Board.

SECRETARY MAYO: Here is a list of applications for membership which have been favorably recommended by the Executive Board.

(The list was read, and it was voted on motion of Dr. W. Herbert Lowe, duly seconded, that it be approved and the persons elected members of the Association.)

DR. MAYO: The following applications are unfavorably reported, but there is no reflection whatever upon the individual applicants: N. R. Yarborough, James R. Brown, C. W. Crawford, J. F. Kagey, W. B. Casilear, W. G. Saunders and James H. Bias.

(It was voted, on motion of Dr. Kinsley, duly seconded, that the recommendation of the Executive Board be approved.)

REPORTS OF COMMITTEES

THE PRESIDENT: The regular program for this morning is, first, reports of committees. The Committee on Intelligence and Education is not ready to report. The report of the Committee on Resolutions we will not call for unless they have some special report at this time.

(The report of the Auditing Committee was next called for, but the chairman was not present. The Committee on Necrology was not ready.)

THE PRESIDENT: We will hear from the Committee on Nomenclature, Dr. Murphey.

REPORT OF COMMITTEE ON NOMENCLATURE

DR. MURPHEY: The committee has stood pat during the past year on account of the fact that there was some doubt in our minds as to our status, for the reason that our recommendations were disapproved in part by the Executive Committee and so reported back in the three articles passed by the Association in regard to two points, namely, the adoption of the list of terms as submitted, and second, the publication of the list.

The 1920 report is what we asked particularly for the adoption of, and we would like to present it at this time.

A. In view of the fact that the American and British associations of anatomists will not complete their reports for several years, and that the B. N. A. terms will form the basis of their final report, we move that the committee be continued to prepare and submit a table of suggested English equivalents together with such additions and corrections as are necessary to conform to the lists of the American Association of Anatomists, and that the committee be directed to cooperate with the veterinary anatomists of other English-speaking countries in the preparation of said lists of anatomical terms.

B. We move the adoption of the Latin terms previously submitted.

H. S. MURPHEY,

F. W. CHAMBERLAIN.

THE PRESIDENT: We shall have to ask Dr. Murphey to explain to you what that means.

DR. MURPHEY: At the Chicago meeting several years ago the suggestion was made that we try to adopt a uniform set of anatomical terms. The principles on which that should be done were submitted and adopted at the Indianapolis meeting. Following that, the first list of terms was presented at the New York meeting. That list was received and published in the proceedings of that meeting, but not officially adopted; and then there were several years between this time. The second list was submitted last year, after having been first submitted to the teaching faculties for criticism and additions. That list was filed with the Secretary of the Association. We are asking for the adoption of that list. The Association accepted the Latin terms, and it deserves a good deal of credit, particularly Dr. Newsom of Colorado for bringing it to the attention of the Association.

The anatomists of the world will eventually work out a uniform set of terms for human and veterinary anatomy. It may be years before that is done, but in the meantime we should have a uniform set of terms that will be considered the language of anatomists among English-speaking peoples, and that is what the committee is asking.

There is a difference in opinion as to whether we should use Latin terms or English equivalents. I am not sure whether the committee is entirely satisfied in their own minds, but we thought it would be advisable to have a set of English equivalents made. However, we didn't think that would be advisable until the Latin terms were adopted. There will undoubtedly be some changes to conform with what will be an official nomenclature.

(It was voted, on motion of Dr. Murphey, seconded by Dr. W. Herbert Lowe, that the report of the Committee on Anatomical Nomenclature be adopted.)

THE PRESIDENT: The next committee is the Committee on Bovine Tuberculosis. (This committee was not ready.)

Then we will hear the report of the Committee on Abortion, Dr. Fitch.

REPORT OF COMMITTEE ON ABORTION

(Dr. Fitch read the printed report of the Committee on Abortion, as follows:)

A disease of cattle, variously known as contagious, infectious and epizootic abortion, and slinking and dropping of calves, is widely prevalent throughout the United States and Europe, and has been observed and studied in South America, Asia, Africa and Australia. In the United States the losses due to it have reached alarming proportions and threaten to increase in the future.

Your committee, therefore, submits the following summary of the present knowledge concerning this disease:

1. Though various causes for the occurrences of abortion in cattle exist, only one kind of infectious abortion disease of cattle has been proved to be both widespread and common. For this disease the name "bovine infectious abortion" is recommended.

2. Bovine infectious abortion is characterized as a rule by an interference with the development of the fetus, frequently resulting in its premature expulsion, either dead or alive, viable or unviable. There is also a frequent manifest inflammation of the fetal membranes and of the maternal cotyledons, together with frequent retention of the afterbirth. A cow may be the carrier and disseminator of the germs of the disease without showing symptoms of her dangerous condition.

3. In this disease complications are frequent and include more or less severe inflammation of either or both the superficial and deeper structures of various parts of the reproductive organs, and temporary and permanent sterility and interference with milk and flesh production are common phenomena.

4. The essential cause of bovine infectious abortion is *Bacterium abortus* (Bang).

5. The microorganisms most commonly found in connection with the sequelæ of bovine infectious abortion are the common pyogenic bacteria.

6. It has been proved that the *Bacterium abortus* (Bang) can enter the body via the digestive tube. That it may also enter through other channels (genital tract), etc., is not disputed but has not been definitely proved.

7. *Bacterium abortus* (Bang) possesses peculiar biological requirements which are found in the pregnant uterus and in the udder. The microbe localizes in these places and has been found in the lymph nodes of the lymphatic system draining the udder. In the udder it often persists indefinitely, while in the post-parturient uterus it has been isolated after 58 days, but usually can not be found after three weeks. It is usually found in the stomach and intestines and less commonly in other organs of the aborted fetus.

8. In the bull *Bacterium abortus* (Bang) has been found in the reproductive organs, seminal fluid as well as in urethral discharges.

9. *Bacterium abortus* (Bangs) produces in the pregnant cow an inflammation of the chorion and the fetal and maternal cotyledons, in the udder no gross, visible alterations, in the bull abscessation and other changes of the genital organs, and in the fetus no well-defined pathological alterations.

10. *Bacterium abortus* (Bang) leaves the affected animal with the dead fetus and fetal membranes and through the uterine discharges via the vagina and with the milk from the infected udder and with the discharges from the genital organs of the bull. The bacillus probably also occurs in the alvine discharges of viable fetuses from affected cattle.

11. *Bacterium abortus* (Bang) has been found to persist alive in the material in which it is discharged outside the bovine animal for many weeks.

12. The diagnosis of bovine infectious abortion is possible through a study of the history and condition of the herd, by means of the serum tests (agglutination and complement fixation) and bacteriological studies of infected material.

13. The attempt to control bovine infectious abortion should conform to the principles of sexual hygiene and general sanitation, making the efforts specific in so far as our knowledge of the etiology of the disease permits. Unimpeachable experimental work has not yet shown that biologies are of positive value in the control or treatment of this disease.

14. To reduce the economic losses incident to and attendant upon bovine infectious abortion requires rational treatment such as the qualified veterinarian is competent to give.

In addition to the presentation of this statement of facts concerning bovine infectious abortion, your committee recommends that adequate funds be provided for further investigations of bovine infectious abortion and strongly urges *better coöperation* among the various research workers.

In order to make this recommendation effective we respectfully ask for the adoption of the following resolution:

"Whereas, Bovine infectious abortion is an exceedingly and increasingly destructive animal plague and is responsible for serious economic loss,

"And whereas, Additional knowledge for the control of this complex scourge is necessary and should be obtained at the earliest possible time,

"Therefore be it Resolved, That the American Veterinary Medical Association strongly urges that larger appropriations for the investigation of bovine infectious abortion be made by Federal and State Governments and through such agencies as the National Research Council to make possible coöperative work by the institutions engaged in investigating this disease."

DR. FITCH: I respectfully move the adoption of this report.

(It was voted, on motion of Dr. Fitch, seconded by Dr. W. Herbert Lowe, that the report of the Committee on Abortion be adopted. Dr. W. H. Hoskins then moved that the report of the Committee on Abortion be received and published. This motion was seconded and carried.)

DR. MCAUSLIN: Mr. President, in view of the very excellent shape of the report, I move a vote of thanks to the committee, and especially to Dr. Fitch.

DR. W. HERBERT LOWE: I take great pleasure in seconding that motion. (The motion was carried.)

THE PRESIDENT: I want to say, personally, that this, to my mind, is one of the best reports we have had on the subject, and in the best and most condensed form for us to understand.

We will now listen to the report of the Auditing Committee, Dr. Day.

REPORT OF AUDITING COMMITTEE

DR. L. E. DAY: Mr. Chairman, I wish to report that your committee has looked over the books of the Secretary and also those of the Treasurer, and we find that the reports are correct as printed and distributed.

THE PRESIDENT: What shall we do with the report?

(It was voted, on motion of Dr. W. Herbert Lowe, duly seconded, that the report of the Auditing Committee be adopted.)

REPORT OF INTERNATIONAL COMMITTEE ON BOVINE TUBERCULOSIS

THE PRESIDENT: We will go back, if there are no objections, to the report of the International Committee on Bovine Tuberculosis. Dr. Reynolds.

DR. REYNOLDS: Gentlemen of the Association, when I get through reading this very short report I am going to move its adoption and the acceptance of its recommendations, and that will mean, if you adopt that motion, that you will be committed to certain definite things. The present committee has undertaken to try to start something definite in the hope of accomplishing something definite, at least in the future.

(Dr. Reynolds read the report of the committee, as follows:)

The urgent problems with reference to tuberculosis seem now to lie in the direction of control work. In order to accomplish something definite, we have endeavored to start a line of constructive work on a series of problems which can be studied, and upon which definite recommendations can be made. We have always needed still more accurate methods of diagnosis. With the thermal alone we leave tuberculous cattle in the herd at times, and at times we condemn presumably nontuberculous cattle. The status of the intradermal and ophthalmic tests for official work is yet to be determined. Veterinary sanitarians need authoritative information. The public needs uniformity of method among States and the Federal Government. A large number of States and the Bureau of Animal Industry have officially and fully accepted the intradermal. Others refuse any except the thermal.

Recommendation No. 1.—We therefore recommend that the several tuberculin tests be made a special subject for continued study by the Committee on Bovine Tuberculosis. It has seemed apparently necessary first of all to establish a standard of reaction for the intradermal test before any official statement from the committee can be made concerning the relative accuracy or practical desirability, or concerning the question of its official recognition for Federal and State work.

For the first definite problem, therefore, we suggest the question as to what constitutes an intradermal reaction, and we recommend that the statement yet to be made be based upon a questionnaire sent to the entire membership of this Association, as well as upon a study of definite information that may be available in print. In this report a statement should be made as to what constitutes a reaction.

Questionnaire Concerning Intradermal Reaction

"1. In your experience, what constitutes an intradermal reaction to tuberculin?"

"2. What is the average period of time after injection when the reaction begins to assert itself?"

"3. What is the average number of hours after injection when the reaction reaches its most marked point?"

"4. What is the average duration of reaction?"

"5. Describe phenomena which in your observation constitute a reaction.

"Upon approximately how much work with this test are your answers based?"

In view of the urgency of such definite information, we recommend that the conclusion of the committee upon this point be submitted to the Executive Board at its mid-winter session, and if approved that the Executive Board be authorized to accept it and provide for immediate publication and distribution.

In the studies relative to the various modes of applying tuberculin, your committee suggests that special attention should be given to the toleration for tuberculin that seems to develop in the body generally and in the skin from previous injection of tuberculin, and, on the contrary, the seemingly increased sensitiveness to tuberculin which previous exposure of the animal to the agent in any way develops in the mucous membrane of the eye.

Recommendation No. 2.—We would call the attention of this Association to the importance and the need of collecting all possible data that may throw light on the recurrence of tuberculosis in clean herds, and recommend that this be made a work for future consideration by the Committee on Tuberculosis. This would, of course, include faults of tuberculin tests and errors on the part of operators as well as unrecognized methods of distribution of the virus.

Recommendation No. 3.—We would recommend that this Association memorialize the Bureau of Animal Industry and the American Meat Packers' Institute, calling attention to the importance of careful autopsy work for officially condemned cattle, and request provision for more time and careful autopsy of such cattle before reporting "no lesions." As compared with the total number of cattle passing over the killing floor, the number of no-lesion cases is comparatively small, and such request does not appear to your committee unreasonable, in view of its importance.

We recognize that with the knowledge now available the financial aspects of tuberculosis control are the most fundamental of all its problems, and would call attention to the very plain fact that before an amount of control work can be done that will actually reduce tuberculosis over the United States and Canada to an appreciable extent, we must have available a vastly increased fund, or we must develop less expensive methods, or we must do both. This involves several serious questions which your committee did not think wise to discuss at this time, *e. g.*, reduction of reimbursement expense, and possibly more economical disposal of reactors than by immediate slaughter.

Recommendation No. 4.—The committee begs to remind this Association of the suggestions made by the committee last year for the consideration of some system of tax on meats handled under Federal inspection, the revenue derived from this source to be expended in the suppression of food-destroying diseases of domestic animals.

Recommendation No. 5.—Your committee feels that it is necessary to call attention again to the necessity of careful tuberculin test work at the hands of experienced veterinarians, trained for this work. We therefore suggest that this Association urge upon the appropriate Congressional committees the appropriation of sufficient funds for the payment of reasonable salaries to such men, and we recommend that proper distribution be made as between reimbursement and overhead expense in the way of salaries, in order that the most competent help obtainable may be employed.

Recommendation No. 6.—Since the report of the International Commission on the Control of Bovine Tuberculosis was issued some years ago there have been many important developments which we feel should be put freely before the public by this Association. We therefore recommend that immediate provision be made for the publication and distribution of a revised edition of this report, which should give the essential facts concerning bovine tuberculosis in simple language.

Recommendation No. 7.—We recommend the preparation of a short popular article to be published by this Association defining the causes and conditions on which the persistence and spread of tuberculosis depends, together with the definition of such measures as seem desirable to overcome such spread of tubercle virus. Your committee has ways in mind by which a very large number of copies of this article could be distributed to the members of this Association, and throughout the United States, at no cost to the Association.

M. H. REYNOLDS, *Chairman*.
C. E. COTTON,
J. J. FERGUSON,
E. C. SCHROEDER.

(Applause.)

DR. REYNOLDS: I move the adoption of the report and the acceptance of its recommendations.

DR. W. HERBERT LOWE: We have before us a very comprehensive report. I feel that the committee has given this subject careful consideration, and therefore I take pleasure in seconding the motion as made by the chairman.

DR. KINSLEY: There were three or four different recommendations. It would appear to me that it would be better to take up each of those recommendations separately. Therefore I move an amendment to the motion to take up each recommendation separately.

DR. DE VINE: I think Dr. Kinsley's idea is splendid, but I think if we do that, we may resign ourselves to giving up this morning to that particular work.

THE PRESIDENT: I hardly think we have time to enter into that and carry it out, together with the program.

(It was voted, on motion of Dr. Reynolds, seconded by Dr. W. Herbert Lowe, that the report of the Committee on Bovine Tuberculosis be adopted.)

DR. HILTON: If I have permission, I would like to suggest, in regard to the Committee on Tuberculosis, that that report is a very important matter. It might be possible to have a discussion of that this evening at 5 o'clock.

THE PRESIDENT: If that is taken up by a special order, we can.

PRESENTATION OF PAPERS

THE PRESIDENT: We will omit further reports of committees and go on to the regular program. The first paper is "Veterinary Educa-

tion and Its Readjustments," by Dr. C. D. McGilvray, Toronto, Canada.

(Dr. McGilvray read his paper, which will be published in a later issue of the JOURNAL.)

SECRETARY MAYO: Mr. President, I move the discussion of this paper be postponed until the report of the Committee on Intelligence and Education is heard, and the whole subject be taken up at that time.

(The motion was seconded and carried.)

THE PRESIDENT: The next paper on the program is "The Relation of the Agricultural Press to the Veterinarian," by E. S. Bayard, Editor of the *National Stockman and Farmer*, Pittsburgh. (Applause.)

(Mr. Bayard's paper is published elsewhere in this issue.)

DR. KINSLEY: I am certain we have all appreciated Mr. Bayard's address, and I move that we extend a rising vote of thanks to him.

(The motion was seconded and carried, and the audience rose and applauded Mr. Bayard.)

THE PRESIDENT: The next paper on the program is "Sound Livestock Sanitary Laws; Their Value to the Farmer and Breeder," by Mr. H. H. Halliday, Commissioner of Animal Industry, Lansing, Michigan.

DR. DUNPHY: I have Mr. Halliday's paper. He, unfortunately, could not be here. It is a short paper, and I will read it, or have it read by title.

THE PRESIDENT: I suggest, owing to the shortage of time, that we have it read by title.

(Mr. Halliday's paper will be published in a later issue of the JOURNAL.)

THE PRESIDENT: The next paper is "The International Exchange of Livestock," by Mr. G. F. Finley, Sydney University, Australia.

(Mr. Finley read his paper, which will be published in a later issue of the JOURNAL.)

THE PRESIDENT: We will not open this paper for discussion on account of lack of time. If there is nothing special to come up on it, we will call for the report of the Committee on Intelligence and Education. This is an important report, and we would like to have everybody remain to hear it.

REPORT OF COMMITTEE ON INTELLIGENCE AND EDUCATION

(Dr. Cassius Way presented the following report:)

During the year one vacancy and two resignations from the committee necessitated the appointment of three new members. Due to these changes, the organization of the committee was delayed and the work of inspection of colleges was necessarily postponed until the latter part of the school year 1919-20, and it was necessary to delay a few inspections until after the sessions had closed.

During the past year the following veterinary colleges have discontinued:
Chicago Veterinary College, Chicago, Ill.
McKillip Veterinary College, Chicago, Ill.
Cincinnati Veterinary College, Cincinnati, Ohio.

Only the first of these three institutions was recognized by this Association last year.

During the past two years all veterinary colleges at present giving instruction in the United States and Canada have been visited by members of the committee. During the session of 1918-19 the following veterinary colleges were visited, and material for this report is taken from data obtained during these inspections, together with additional information received from the deans of these institutions during the present year:

Colorado State College, Division of Veterinary Medicine.

Kansas State Agricultural College, Division of Veterinary Medicine.

Michigan Agricultural College, Division of Veterinary Science.

Ontario Veterinary College, Toronto University.

University of Pennsylvania, School of Veterinary Medicine.

During the present year 1919-20, the following institutions have been visited by members of this committee:

Alabama Polytechnic Institute, College of Veterinary Medicine.

Georgia State College of Agriculture (Veterinary Degree Course).

Indiana Veterinary College.

Iowa State College, Division of Veterinary Medicine.

L'Ecole de Médecine Vétérinaire, Université de Montreal.

New York State Veterinary College, Cornell University.

New York State Veterinary College, New York University.

Ohio State University, College of Veterinary Medicine.

State College of Washington, College of Veterinary Science.

St. Joseph Veterinary College.

Texas Agricultural and Mechanical College, School of Veterinary Medicine.

Detailed information submitted to the committee relative to entrance requirements, curricula, faculties, methods of teaching, equipment, etc., has been carefully considered. With one exception, all of these institutions are complying with the regulations of this Association in reference to entrance requirements and length of curriculum. With practically no exception there are varying degrees of improvement that might be suggested.

Two colleges, L'Ecole de Médecine Vétérinaire (Université de Montreal) and Georgia State College of Agriculture (Veterinary Degree Course), requested initial inspections preparatory to seeking recognition by this Association as approved institutions. One college, the St. Joseph Veterinary College, requested inspection with a view to making application for reinstatement to the approved list of the Association.

1. L'Ecole de Médecine Vétérinaire, Université de Montreal. This institution, affiliated with the University of Montreal, is a French school, all instruction being in the French language. The school was founded as a private institution in 1886, and has graduated 268 veterinarians. Beginning with the session 1920-21 it will be under the direct control of the University of Montreal. The school is adequately housed in buildings provided by the University, and secures both Provincial and Government support, the actual amount depending upon the number of students in attendance. Since 1917 a four-year curriculum has been maintained, each year's school work being divided into two semesters of sixteen weeks each. The preliminary educational requirements are a high-school education or its equivalent. According to French custom, students often receive their preliminary education in private sectarian institutions, and those desiring to take up a higher education are required to take special examinations for entrance under the direction of a special board of governors. This examination is rigid, and, if satisfactorily passed, an entrance certificate is issued which corresponds to a high-school certificate. High scholarship standards are apparently maintained, the system of conducting examinations being conducive to thorough work on the part of the students.

Twenty-four students were in attendance during the past year. This comparatively small number is due to the effect of war conditions. No

senior class was graduated this year on account of the fact that the school adopted a four-year curriculum beginning with the session 1917-18.

The veterinary school occupies the entire first floor of a modern three-story building, the two upper floors being occupied by the Dental School of the University. Here are located the general offices, class rooms, laboratories, library, etc. A new two-story building provides hospital facilities for large and small animals, also a clinical amphitheater and anatomy laboratory. The general teaching facilities and methods employed seem good and the various instructors competent. One was impressed by the general cleanliness of the buildings. Clinical records, including medical and surgical clinics, operative surgery, etc., were on file and available for examination. The general appearance and impression created by the institution, attitude of faculty, etc., is such as to lead the committee to believe that the school is being conducted efficiently.

After conference with graduates of the institution and representatives of the Veterinary Service of the Dominion of Canada regarding certain specific points, this committee recommends that the work in meat and milk inspection be improved, and the time allotted for teaching these subjects be increased. This suggestion is prompted by the fact that in examinations conducted by the Civil Service Department of the Dominion a majority of the graduates of the institution seemed to be deficient in these subjects. The committee further recommends that the number of cases in medical and surgical clinics be increased, and also the increasing of the number of bovine cases in these clinics.

2. The Georgia State College of Agriculture (Veterinary Degree Course) was visited by a member of the committee. The number of students in attendance at this institution is small. The institution, however, in the opinion of the member of the committee making the inspection, is apparently doing fairly satisfactory work. In view of the fact that the first graduating class to receive a degree in veterinary medicine will not complete the course of instruction leading to this degree until 1921, the committee deems it advisable to withhold recognition of this college until the present senior class has been graduated and the institution actually has graduates eligible to A. V. M. A. membership. The committee advises and recommends additional and more modern accommodations for hospital purposes, and additional facilities for teaching anatomy separate from the hospital building; also that better equipment for the teaching of gross pathology be provided, including adequate postmortem facilities. Thorough discussion of these recommendations and future plans for the institution have been held with the dean. The secretary of this committee will communicate with the authorities of the institution, setting forth these recommendations.

3. The St. Joseph Veterinary College was dropped from the approved list at the Fifty-sixth Annual Meeting of the Association for failure to meet A. V. M. A. matriculation requirements effective at the beginning of the session of 1919-20. Upon investigation this committee found that of a total of 50 freshmen classified for the session 1919-20, only 5 could have matriculated on the basis of the A. V. M. A. regulations, the other 45 failing to meet the required entrance qualifications. This class, matriculating contrary to the A. V. M. A. regulations, constitutes practically one-third of the student body of this institution. Of the three upper classes, 23 students entered from other veterinary schools with apparently very lax examination of advanced credits. In view of these serious conditions, and in justice to institutions accredited by this Association which have met the entrance requirements, your committee does not feel justified in recommending the approval of this institution.

During the investigations of the various other colleges, made by the committee, many discrepancies in equipment, teaching facilities and methods were discovered in several institutions. In the majority of cases these discrepancies can be remedied within a reasonable time, provided the authorities and trustees of the institution have the funds available and see fit to

comply with the recommendations made by the committee. In some instances, regulations in reference to requirements as to the teaching staff as laid down by the A. V. M. A. and the Bureau of Animal Industry are not being fulfilled. In the main, the criticisms made by the committee involve—

(a) The teaching of certain basic subjects, such as animal husbandry, chemistry, etc.

(b) The lack of proper facilities for the teaching of anatomy and other fundamental major subjects.

(c) The lack of proper laboratory facilities for teaching gross pathology and the examination of clinical material for use in diagnosis work.

(d) Lack of systematic administration of clinics and keeping of uniform records which are valuable in teaching work, and as reference data for students.

(e) Lack of general facilities and equipment owned and controlled by the institution for the teaching of many of the major subjects of a properly organized veterinary curriculum.

These criticisms and suggestions as pertaining to each individual institution have been discussed with the dean, and in every case we are advised that satisfactory adjustment of undesirable features will be effected at the earliest possible time. The details of these criticisms and suggestions are on file with the committee and are available to any member of the Association desiring to review them.

Your committee fully realizes that certain of these institutions should not be unconditionally approved by this Association. However, due to delay in organization of the committee, inspection in some instances was not conducted during the college year; and in view of recommendations presented later in this report the committee deems it advisable to recommend for approval the list of colleges as hereafter specified.

The value of an educational institution is clearly determined in the quality of its faculty and the character of its teachings. These qualifications are in turn reflected by the ability and quality of its graduates. In the final analysis, no educational institution in this country is responsible in any way to any committee or any part of this Association. Unfortunately, too many institutions in the past have looked upon recognition by this Association and the Bureau of Animal Industry as the great goal of final attainment, and in meeting the limited requirements and superficial suggestions of these bodies, as outlined in the past, have felt that their obligations to their students, to the profession and to society have been fulfilled.

In investigating the veterinary schools recognized by this Association, your committee has been impressed by the great variety of educational methods and standards, as well as the very apparent differences in the quality of education being offered by the various institutions.

While preliminary educational requirements have been standardized and are now uniform in all recognized veterinary schools, and a minimum length of curriculum has been established which has placed veterinary education on a par with other lines of professional education as far as time requirements are concerned, there exist at present most remarkable differences in the general educational qualifications and methods of the various institutions. These differences include personnel and organization of school faculties, sequence and apportionment of time to the various subjects in the curriculum, administration and supervision of the educational work of the school, general teaching equipment and facilities, character of research work being done, and, probably most important of all, the product of the school, *i. e.*, the quality of its graduates as denoted by records made before State and National examining boards.

The present educational standards required of veterinary institutions by this Association, aside from matriculation requirements and length of curriculum, are the standards set by the Bureau of Animal Industry governing the entrance to the examination for veterinary inspector under civil

service regulations. It is the opinion of this committee that these standards do not adequately specify the standards of a modern school of veterinary medicine.

Since the A. V. M. A. is the recognized representative organization of the veterinary profession in this country, this Association should establish, as has been done by the American Medical Association in the case of medical schools, definite standards whereby the "essentials of an acceptable veterinary school" will be specified, and in addition formulate a definite schedule whereby the various veterinary schools may be graded and classified. An attempt by this Association to standardize and improve veterinary education as suggested will necessitate primarily a detailed study of the general veterinary educational situation, a careful survey of all institutions, a consideration of the present demands upon the profession for service, and the general responsibilities of the profession to the public as related to the training of the individuals entering the profession. The results will be a better organization of school faculties, more efficient teachers, improved teaching methods, better apportionment of time to various subjects in the curriculum, the teaching of certain subjects in a more logical sequence, improved teaching and clinical facilities, and ultimately better trained veterinarians. Again, any school falling below what may be termed "Class A" could be readily furnished with exact data as to why so classified, which information could be used by the dean of the particular institution as an aid in securing facilities that would place this school in "Class A." In fact, assistance along this line has been furnished this year by your committee upon solicitation by the deans of certain institutions.

After careful discussion in the committee and with many of the deans of the various veterinary colleges of the country, your committee respectfully requests a careful consideration at this time of this most important subject. Better veterinarians, better veterinary service, and better recognition of the profession by livestock owners and society is greatly desired. We must eventually face this problem just as the American Medical Association faced its problems some fifteen years ago. It is thoroughly believed by this committee that after the inauguration of a definite and specific program such criticisms as have emanated from various sources during the past year against our profession and our educational standards will, of necessity, not appear in the future.

From the records and data obtained by the committee, there are 14 schools recommended for approval and one institution apparently in line for approval next year. There are approximately 1,000 students in attendance at these institutions, all of which are located in North America. It is conservatively estimated that a greater number of graduates than are apparently forthcoming from these institutions are needed each year to replace practitioners who may retire from active work for various causes, and to supply the needs for veterinarians in the Bureau of Animal Industry, the United States Army and State and municipal service.

Clearly the supply of young veterinarians for the immediate future is inadequate. With the demand of livestock owners for better veterinary service comes the need for better veterinarians to be graduated from our institutions in the future. This demand necessitates veterinarians with not only a better preliminary training, but also a better scientific and technical education. In some States county veterinary advisers are being employed for consultation service by the large livestock owners and farmers, to work in conjunction with the Farm Bureau advisers. If these counsellors adhere strictly to the scope of work for which they are retained, without infringing on the rights and the field of the private practitioner, this may be a good omen and the field for work of this character is in evidence. In order that future veterinarians who may assume responsibilities of this nature may be thoroughly equipped and in every way on a par with agricultural college graduates, your committee recommends that careful consideration of higher educational standards be considered by this Association.

In view of the fact that it is clearly advisable at this time to bring before prospective students the advantages of the profession and the opportunity for service to the livestock industry, it is recommended that a high-class, ethical publicity campaign be inaugurated in order that young men who may be interested and influenced to take up the study of veterinary medicine may be reached. During the past year or two many large universities have found it necessary to appeal to their alumni for support, and campaigns for funds have been launched by some of our great institutions of learning. In some cases very high-class and ethical advertisements have presented the needs of these institutions through the columns of the daily press, magazines and journals of various kinds. In order to present this subject to prospective veterinary students your committee recommends that it be empowered to work out an educational publicity campaign, submit the same to the Executive Board, and inaugurate the same if deemed advisable by joint conference of these bodies. It is proposed to set before young men who may enter the profession, as well as the livestock owners of the country, the great service that is being rendered by the profession, the great possibilities for still better and more efficient service, and the high ideals and standards of the profession as pertain both to entrance requirements and to scientific and technical education.

Livestock owners, agricultural associations, farm bureau organizations and the general public should be thoroughly advised of the scope of the veterinary profession. With three-fifths of the agricultural products of the country being of livestock origin, the public is little aware of the great field of the profession. By the laity who know, the profession is no longer considered as pertaining mainly to "doctoring horses," but the great fields of food control, research in animal diseases, sanitation and public health work are recognized. This knowledge should be more universal.

It is thoroughly believed and suggested by the committee for consideration by this Association that some such method of publicity must prevail, in order to bring before young men with the proper training the advantages of service in the profession, so that the livestock industry may be safeguarded against a possible shortage of scientific men in this profession that will eventually lead to increased losses from disease among our domesticated animals, which losses are already too great.

Summary

1. This committee recommends the approval of the following veterinary colleges for the ensuing year:

- Alabama Polytechnic Institute, College of Veterinary Medicine.
- Colorado State College, Division of Veterinary Medicine.
- Indiana Veterinary College.
- Iowa State College, Division of Veterinary Medicine.
- Kansas State Agricultural College, Division of Veterinary Medicine.
- L'Ecole de Médecine Vétérinaire, Université de Montreal.
- Michigan Agricultural College, Division of Veterinary Science.
- New York State Veterinary College at Cornell University.
- New York State Veterinary College at New York University.
- Ohio State University, College of Veterinary Medicine.
- Ontario Veterinary College, Toronto University.
- State College of Washington, College of Veterinary Science.
- Texas Agricultural and Mechanical College, School of Veterinary Medicine.
- University of Pennsylvania, School of Veterinary Medicine.

2. This committee recommends that it be empowered to formulate a plan of educational publicity, and that the same be submitted to the Executive Board; that the combined bodies be empowered to inaugurate the educational publicity campaign previously outlined in this report, and that sufficient funds be provided to conduct properly such a campaign.

3. This committee recommends that it be empowered to draft and outline suitable requirements for an acceptable veterinary college and for the

proper grading of veterinary colleges into classes A, B and C; that this outline be submitted to the Executive Board, and that the two bodies be empowered to inaugurate the use of the same for the inspection of veterinary colleges during the coming year 1920-21.

4. In order that sufficient funds may be available for the work of the Committee on Intelligence and Education to carry out the inspection of veterinary colleges, it is respectfully requested that the Budget Committee, if it deems advisable, increase the appropriation for the work of this committee from \$500 to \$1,000 for the ensuing year.

Respectfully submitted,

CASSIUS WAY, *Chairman.*

(Term expires 1922.)

L. ENOS DAY,

(Term expires 1921.)

B. T. SIMMS,

(Term expires 1924.)

H. D. BERGMAN, *Secretary.*

(Term expires 1923.)

THE PRESIDENT: Gentlemen, you have heard the report of the committee and its recommendations.

DR. R. C. MOORE: Mr. President, I would like to recommend the adoption of the report with the exception of that part in reference to St. Joseph, which I would like to explain to this Association, which I have no time to do now. Therefore, I would like to have that portion postponed until such time when I can put before the Association the evidence which I have in my hands. (Seconded.)

DR. STANGE: I offer an amendment to the motion, to adopt the report of the committee as read. I believe that if the St. Joseph Veterinary College has anything to offer, they can offer it tomorrow, and by a motion their school can be included in the list, if necessary. (Seconded by Dr. Fitch.)

DR. R. C. MOORE: That will be satisfactory to me, and I will accept it without voting on the amendment, providing I can have the assurance that I will be given that privilege tomorrow.

THE PRESIDENT: It is understood that Dr. Moore will have the privilege tomorrow of presenting his statement.

(The motion to adopt the report of the Committee on Intelligence and Education was carried.)

DR. R. C. MOORE: Could I have any specified time when I can bring this matter up?

THE PRESIDENT: Bring that up tomorrow morning at the time of the committee reports.

(The Committee on Intelligence and Education also submitted, with its approval, the following:)

We, the undersigned, hereby propose for honorary membership in this Association Hon. E. T. Meredith, Hon. Alvin H. Sanders and Editor A. J. Glover.

As Secretary of Agriculture, Mr. Meredith has done much for the profession. The Bureau of Animal Industry veterinarians are truly grateful for his loyal support. As an executive he has been fair and just in all questions pertaining to the good of the service. As a livestock owner and breeder he has materially contributed to the advancement of the industry, and as an editor he has championed the cause of better agriculture.

Mr. Sanders, as editor of that great livestock publication, *The Breeders' Gazette*, has through his great influence enhanced the value of purebred livestock, and has by his writing helped to make possible the development of that great field in which the veterinarians of this country have such fine opportunity for service.

Mr. Glover, as editor of a most influential publication, devoted almost exclusively to dairying, *Hoard's Dairyman*, has been a potent factor for better things in that great field of agriculture. He has supported the veterinarian in his honest endeavor to eradicate disease. He is active in the work of the United States Livestock Sanitary Association. He has done much for the veterinary profession in its fight to stamp out tuberculosis and is a staunch advocate of higher and better things for our profession.

It would seem that it is an unusual privilege for us as a profession to recognize at this time the work of these three great servants of agriculture.

J. R. MOHLER,
V. A. MOORE,
CASSIUS WAY.

(On motion, duly seconded, Messrs. Meredith, Sanders and Glover were elected to honorary membership in the Association.)

Adjournment.

(Proceedings to be continued.)

Two petitions requesting new sections for the A. V. M. A. were presented to the Executive Board at the Columbus convention by those interested in small animal practice and in laboratory research work, respectively. The Executive Board decided wisely to create no additional sections for the present, but proposed to change the name of the Section on College Faculties and Examining Boards to the Section on Education and Research which will meet present requirements and permit those engaged in laboratory investigations to come together for the discussion of matters of common interest.

On learning of the Executive Board's decision, the Section on General Practice proceeded to elect for secretary a man who has always been deeply interested in small animal practice and it is planned to encourage those engaged in this line to present sufficient papers for at least one full session at the next convention.

Before adjournment the three sections of the A. V. M. A. elected the following officers for the ensuing year:

Section on General Practice: T. H. Ferguson, Lake Geneva, Wis., Chairman; W. E. Muldoon, Manhattan, Kans., Secretary.

Section on Sanitary Science and Police: H. D. Jakeman, Indianapolis, Ind., Chairman; B. T. Simms, Corvallis, Oreg.

Section on Education and Research, formerly Section on College Faculties and Examining Boards: F. W. Chamberlain, East Lansing, Mich., Chairman; L. W. Goss, Columbus, Ohio, Secretary.

OTHER MEETINGS

JOINT VETERINARY PICNIC

THE Tippecanoe and Wabash Valley Veterinary Associations held a joint picnic at Lake Cicott near Logansport, Indiana, July 29. Dinner, with chicken galore, was served by the Ladies' Aid in the basement of the little white church just across from the lake front. It was just like the days of real sport, with Skinny and Tubby and everything. Then to the lake proper. It is not the largest lake in America, but it was large enough to hold one of the biggest veterinarians.

Just at 2:16 p. m., Dr. Musselman, of Denver, Ind., mounted the "shoot the chute." When he let loose and slid 40 feet at the rate of 90 miles per into the water, the banks moaned; after several anxious seconds the Doctor rose to the surface and paddled to the shore. When the troubled waters became quiet, the majority of the party spent an enjoyable hour in bathing.

Next was the ball game between the two Associations. Babe Ruth would have looked on with envy at some of the batters. The game was well under way when a gong was sounded announcing that the automobile belonging to the pitcher of the losing side had been stolen. Talk about the speed of a fire truck, multiply it by two, and you will have a faint idea of that crowd sailing for their cars to chase the thief. Some fell by the wayside; others reached their cars only to be informed that a mistake had been made by the wife of the Doctor in attempting to identify their car. It was soon realized that it was all a hoax and that the Doctor had prearranged that scheme to be used in case he saw his team going down to defeat owing to his poor pitching. The final score stood 6 to 5 in favor of the Wabash Valley Association. J. L. KIXMILLER.

SOUTH DAKOTA VETERINARY MEDICAL ASSOCIATION

The summer meeting of the South Dakota Veterinary Medical Association was held at Lake Madison, South Dakota, on August 3 and 4. Fifty-two veterinarians were present and heard lectures on veterinary science by well-known authorities.

The session of the first day was opened by an address by the president. Dr. J. T. E. Dinwoodie of Aberdeen, South Dakota, gave the response to the president's address and explained the legislative

program for the coming year, pertaining to veterinarians. This was followed by a postmortem demonstration on a hog by Dr. G. S. Weaver and the case was diagnosed as hog cholera. Dr. H. A. Hartwich showed some interesting specimens of anthrax in cattle. A banquet was given in the evening of the first day and was a very pleasant affair. Dr. Weaver acted as the toastmaster and Dr. Boyd gave the main talk of the evening. After the banquet the evening session was called and Dr. W. L. Boyd of the University of Minnesota gave an interesting lecture on "Sterility and Infectious Abortion in Cattle." This was illustrated by lantern slides. The following forenoon Dr. Boyd gave the second lecture on "Abortion Disease of Cattle" and very vividly brought out the main points by showing specimens of pregnant and non-pregnant uteri. In the afternoon the business meeting was held and the session closed by everybody expressing his satisfaction of having a good time. The winter meeting will be held at Mitchell, South Dakota, during the live-stock show, in January.

The following officers were elected: Dr. G. S. Weaver, Brookings, president; Dr. James F. McFarlane, Plankinton, vice-president; Dr. Wm. F. Joseph, Iroquois, secretary-treasurer.

WM. F. JOSEPH, *Secretary*.

CONNECTICUT VETERINARY MEDICAL ASSOCIATION

THE summer meeting of the Connecticut Veterinary Medical Association was held at Savin Rock, New Haven, August 10. The following members and visitors were present:

Members—Drs. George E. Corwin, J. L. Devereaux, B. D. Radcliff, G. W. Loveland, W. J. Southey, R. S. Todd, F. W. Page, W. H. Pullen, Wallace F. Vail, George T. Crowley, E. L. Thornton, Earle F. Schofield, Harry E. Bates, G. Leroy Cheney, James J. Flaherty, J. E. Underhill, H. C. Balzer, Edwin Laitinen, J. R. Morin, Charles L. Colton, Thomas Bland, Harrison Whitney, J. S. Schofield, P. T. Keeley, V. M. Knapp, I. R. Vail.

Visitors—Dr. R. L. Smith, Hartford; Dr. M. C. Thompson, Sharon; Dr. Conway, New Haven; Dr. S. A. Selby, New York; Dr. E. I. Smith, Hartford; Dr. F. E. Blake, Springfield; Dr. Benjamin D. Pierce, Springfield, Mass.; Dr. W. Horace Hoskins, New York; Mr. J. M. Hunter, New Milford; Dr. H. J. Milks, Ithaca, N. Y.

The entire time of the meeting was taken up by the reading of the following papers:

Dr. W. Horace Hoskins, Dean, Veterinary Department, New York University, "Some of the Present Day Problems of Veterinary Medicine."

Dr. E. I. Smith, Inspector in Charge, Bureau of Animal Industry, "Relation of the Local Veterinarian to Accredited Herd Test."

Dr. Charles L. Colton, Deputy Commissioner on Domestic Animals, "Timely Topics of Interest to Every Member of the C. V. M. A."

The addresses were of a very high character, instructive and timely, thoroughly enjoyed by all the members and visitors present.

Mrs. W. Horace Hoskins, President of the Ladies' Auxiliary of the A. V. M. A., addressed the ladies on "The Object of the Auxiliary." The following members and visiting ladies were present:

Mrs. Charles L. Colton, Mrs. George E. Corwin, Mrs. V. M. Knapp, Mrs. F. E. Blake, Mrs. George T. Crowley, Mrs. Harrison Whitney, Mrs. Conway, Mrs. R. L. Smith, Mrs. Wallace F. Vail, Mrs. I. R. Vail, Mrs. F. W. Page, Mrs. G. Leroy Cheney, Miss Colton.

GEO. E. CORWIN, *Secretary*.

CONESTOGA VETERINARY CLUB

The Conestoga Veterinary Club held its regular monthly meeting at the Hotel Brunswick, Lancaster, Pa., October 14, 1920. The speaker of the evening was Col. C. J. Marshall of the Veterinary School, University of Pennsylvania; subject, "Pyosepticemia of Colts and Its Relation to Abortion in Mares." He spoke of the work done on this subject by Smith and Kilborne for the Federal Bureau of Animal Industry, Good in Kentucky, Schofield in Canada, Meyer, Hardenbergh and Boerner for the Pennsylvania Bureau of Animal Industry, and the work of several well-known European investigators, including McFadyean and Edwards, Magnusson, Panisset and several others. After reviewing the conditions in a few outbreaks of this disease with which he had been personally interested he gave an extract of the subject by Panisset which was published in the *Revue Générale de Médecine Vétérinaire* of March 15, 1920. This article coincides so fully with the experience and observation made in this country by Dr. Marshall and members of this club that it was felt that the article should be published for general distribution.

B. SCOTT FRITZ, *Secretary*.

COMMUNICATIONS

From the Secretary's Office

To the Editor:

On September 15 there was sent out from the Secretary's office about 1,000 return postal cards to members of the Association in District No. 5, asking for nominations for members of the Executive Board from this District.

District No. 5 comprises Alaska, Washington, Montana, North and South Dakota, Minnesota, Iowa, Nebraska, Wyoming, Idaho, Oregon, the Philippines and Hawaii.

As soon as the nominations are in a postal card vote will be taken. It will probably be the middle of February before the returns can be canvassed as it takes about sixty days, under favorable conditions, to get a letter to the Philippines and reply.

CONSTITUTION AND BY-LAWS

The Executive Board at its recent meeting in Columbus, authorized the Secretary to have copies of the Constitution and By-Laws of the A. V. M. A. printed and also a list of members.

This will be published in booklet form as soon as possible. The list of members will not be published this year in the Journal of the A. V. M. A.

A number of members of the Association are asking the Secretary with reference to Section Seven of the Code of Ethics prohibiting a member of the A. V. M. A. from contracting with any live-stock insurance company for the professional treatment of live stock. A notice to change this section of the Constitution and By-Laws was given at the New Orleans meeting and laid on the table for a year, as required. At the Columbus meeting Section Seven of the Code of Ethics was stricken out.

N. S. MAYO, *Secretary.*

Efficiency of Commercial Biologics

To the Editor:

Recently I received two publications: one on "The Immunizing Value of Commercial Vaccines and Bacterins against Hemorrhagic Septicemia"; the other on "The Value of Commercial Vaccine and Bacterins against Fowl Cholera," both by the same authors, L. Van Es and H. M. Martin, published by the Agricultural Experiment Station of the University of Nebraska as Research Bulletins 17 and

18. After carefully studying these bulletins I was very much surprised that the authors have entirely disregarded any work previously carried out along the same line. These publications have been widely circulated and no doubt many veterinarians will accept the summary as conclusions of carefully conducted research work.

I do not deem it advisable to analyze the publications at this time and only wish to call attention to Bulletin 18 on "The Value of Commercial Vaccines and Bacterins against Fowl Cholera" in which the conclusions are as follows:

"It is evident from the above that no reliance can be placed on the vaccines and bacterins against fowl cholera, which we are able to find on the market and subject to definite tests. We have no doubt as to the possibility of artificial immunity as an aid to the control of fowl cholera, but as yet we will have to get along with the more nonspecific means of prevention, even if those are far from a universal efficiency."

In the face of these conclusions I have before me a publication on "The Use of Bacterin in the Control of Fowl Cholera," by Dr. Winifred B. Mack and Dr. Edward Records, published by the Agricultural Experiment Station of the University of Nevada. The authors of this bulletin have both established a splendid record in research work on animal diseases and do not need any further introduction. Their experiments are recorded in an up-to-date, thorough manner, giving detailed data on every phase of the work. In the conclusions of the last-named publication we find the following paragraphs.

"The use of bacterins in infected flocks produced sufficient resistance to promptly check outbreaks of fowl cholera in fifteen out of sixteen lots of fowls in fourteen flocks, although one flock required three treatments. It failed in another flock in spite of three vaccinations.

"The results of field trials with bacterins as an agent for checking and controlling outbreaks of fowl cholera indicate that it is a practicable, satisfactory method.

"In fourteen out of sixteen lots of fowls treated one or two injections of bacterin satisfactorily controlled the outbreak, with little or no difference in the result. In one lot there was recurrence requiring three treatments. Complete failure resulted in but one of the sixteen lots treated.

"There was no apparent difference in the results whether homologous or heterologous strains of *Bact. avisepticum* were used in the preparation of bacterins. The use of stock bacterins containing several strains appears to be satisfactory, and is the logical method where a stock is to be carried for immediate use when needed.

"Finally, in the last analysis, the value of a protective method must be judged by clinical rather than by experimental results."

Here we are face to face with entirely contradictory results. Besides, as there are many other investigators in this country and abroad who arrived at similar results as Drs. Mack and Records, how should the veterinary profession judge the publication of Drs. Van Es and Martin? It seems if the work of Van Es and Martin would be carried out with any human or veterinary biological products in a manner as recorded by the authors, I dare say we would hardly have today a single biological product which could be considered dependable for the prevention or cure of diseases. Even the classical work of the great Pasteur, in regard to the immunization against anthrax, would be shattered. Just think what would have been the result of the wonderful experiments at Pouilly-le-Fort, demonstrated by Pasteur before a commission on the effectiveness of anthrax vaccination, if Pasteur had not given careful consideration to the infective dose of the virulent anthrax bacilli which were administered to the immunized animals.

Pearl River, N. Y.

A. EICHHORN.

International Veterinary Congress

TURIN, August 30, 1920.

DR. A. EICHHORN,

Pearl River, N. Y.

Dear Colleague:

I have read the letter of our eminent friends and colleagues, Dr. de Jong and Sir Stewart Stockman, relative to the International Congress of Veterinary Medicine planned by the U. S. A. I am in favor of such a move and as one of the older members of the International Commission am very anxious for arrangements for the next International Veterinary Congress in order that that wonderful veterinary organization should continue its activity in the study of diseases of animals and on all other branches pertaining to animal industry.

I would like, however, to advise you that next spring, 1921, the second International Congress of Comparative Pathology will be held at Rome and we hope that on that occasion all eminent members of the veterinary profession of the United States and likewise scientists interested in comparative pathology will be in attendance.

Therefore, it appears it would be of an advantage for your association to coöperate with us and to plan to hold the next Inter-

national Veterinary Congress in 1922 or 1923, which if held in your country I am sure will be a credit to the United States.

I take this opportunity in expressing to you my cordial greetings which you also please convey to all those who are interested in comparative pathology and veterinary medicine.

Affectionately yours,

E. PERRONCITO.

Acknowledgments from Honorary Members

September 20, 1920.

DEAR DR. MAYO:

Upon my return to the office today, your letter of August 30, informing me that I have been elected to honorary membership in the American Veterinary Medical Association, was brought to my attention. In my work here I have come in closer contact than ever before with the activities of the veterinary profession, many members of which are engaged in the Bureau of Animal Industry, and I fully realize its important relation to the live-stock industry of the country. I am grateful for the honor conferred upon me and I hope that you will express my appreciation to the Association.

With all good wishes, I am,

Sincerely, yours,

E. T. MEREDITH,
Secretary of Agriculture.

September 13, 1920.

DEAR DOCTOR:

This is to acknowledge receipt of your note advising me of my election as an honorary member of the American Veterinary Medical Association.

I assure you I appreciate the compliment, and through you thank the members of your organization kindly for this recognition.

Sincerely, yours,

ALVIN H. SANDERS,
Editor Breeders' Gazette.

September 3, 1920.

DEAR MR. MAYO:

Your letter of August 30 received. It was very thoughtful and kind of the members of the American Veterinary Medical Associa-

tion at their fifty-seventh annual meeting to elect me as honorary member of their organization.

I appreciate this recognition, although I do not know whether I deserve it. I have always done the best I knew how to support the veterinarians in their work and to do whatever I could to further this profession. I feel honored by the recognition that your Association has extended to me.

With warm personal regards, I am,

Yours truly,

A. J. GLOVER,

Editor Hoard's Dairyman.

Offers for A. V. M. A. Permanent Home

To the Editor:

The following notice is hereby given to the Veterinary Medical Associations of Iowa, Missouri, Illinois, Indiana and other States contiguous and near the geographical center of the United States, that at the meeting of the Executive Board of the A. V. M. A. a special offer will be presented to the Executive Board for the location of a permanent home for the Editor and Secretary of the A. V. M. A. Unless the States properly located make suitable donations in the way of buildings and place, there will be special offers made by other parts of the United States. All interested please take notice and get busy. These offers will be presented at the meeting of the Executive Board at Chicago some time during the meeting of the United States Live Stock Sanitary Association.

Yours truly,

C. A. CARY.

Breeders' Gazette says editorially of the opposition to tick eradication in the South: "Individual and organized hostility to the enforcement of the tick-eradication law is open or latent in a few regions of some of the Southern States; but the periodical shifting of the Federal quarantine line toward the southern boundary of the United States is a reassuring pledge that the days of the tick in this country are numbered. The Government's campaign to clean out the pest has been scientifically and economically sound. If all the facts and factors were known, however, we should probably be surprised at the rapidity with which the campaign has progressed toward completion."

NECROLOGY

DR. E. M. WIGGS, until recently the State Veterinarian of Texas, died August 10, at Mineral Wells, Texas, having been kicked in the abdomen by a horse earlier in the day.

Dr. Ernest Milligan Wiggs was born near Portland, Ind., September 28, 1878, graduated from the grammar school there and spent one term at the University at Wooster, Ohio. He came to Texas in 1907. He completed his freshman year at the Chicago Veterinary College and graduated from the Kansas City Veterinary College in 1913. He had practiced at the following Texas points: Electra, Wichita Falls, Tyler and Greenville.

Dr. Wiggs was a practitioner and surgeon of unusual ability. Little given to the limelight, many of his methods and the results of his personal research work have benefited the profession, although his name has not been associated with their success. He was a deep thinker, a student with a wide vision, a believer in the equal rights of all men based upon their own qualifications and uninfluenced by political or personal preferment.

Dr. Wiggs gave freely of his time and money that the veterinary situation in Texas might be improved. Driven by a nervous energy far beyond his physical strength, he labored for years and died just as the profession, in solid union and close amalgamation through a thriving State association, faced with renewed confidence the problems that confronted it.

At the amalgamation of the Texas Veterinary Medical Association and the State Veterinary Medical Association of Texas in 1915, Dr. Wiggs was elected to the office of Secretary-Treasurer, which office he held for two terms, refusing for business reasons to continue longer. That his counsels might still be available as an executive committeeman he was elected Second Vice-President. It was during his tenure of office that the profession in Texas bound up its wounds after years of conflict, and became consolidated in the present powerful State Association.

That the stock interests and veterinary interests might be brought into closer understanding, Dr. Wiggs, at the request of the State Association, relinquished his practice at Greenville to accept the position of State Veterinarian of Texas under Governor Hobby's administration. This office he filled creditably until July 1, 1920, at which time he resigned that he might give his undivided time

to the management of his dairy stock farm at Mineral Wells. Here the same restless energy worked him beyond his strength or he might have rallied and fought off the injury that resulted in his death.

The profession has lost a distinguished member and the world at large a humanitarian who meant much to it. Dr. Wiggs leaves a wife and two children.

N. F. WILLIAMS.

DR. PETER P. PETERSEN died at San Francisco, Calif., December 24, 1919, leaving a wife and two small children.

Dr. Petersen attended the University of California and was a graduate from the New York State Veterinary College at Cornell, 1915. In 1917 he joined the A. V. M. A. Dr. Petersen was associated for a time with the veterinary department of the University of California. He was an active and able veterinarian and was very highly thought of on the Pacific coast. He was a leader in his profession.

A MEMORIAL GIFT

Mrs. John F. Winchester, formerly of Lawrence, Mass., has presented the entire library of veterinary works of her late husband to the Alexander Liautard Library. Upwards of three hundred volumes, including a complete set of the *American Veterinary Review* beautifully and substantially bound, with a complete set of a very early edition of Percival's *Hippopathology* and many older editions of other veterinary publications now out of print, will be of utmost value to the students and research men in veterinary fields.

The Liautard Library of over three thousand volumes is now one of the most valuable veterinary libraries in the land. Greater facilities for consulting and using this library have been completed by New York University.

MISCELLANEOUS

THE TRAGEDY OF HAEMONCHUS

(Tune: *Who Killed Cock Robin?*)

[Sung at the Tenth Anniversary Dinner of the Helminthological Society of Washington, June 20, 1920. Verses by Dr. M. C. Hall; choruses by Capt. R. Daubney, M.R.C.V.S. Doctors Cobb, Hassall, Ransom, Schwartz, and Curtice were at the dinner.]

Who named Haemonchus?
I, said Doctor Cobb.
I did that little job,
I saw his onchus.

Cho.: The parasites and commensals
Said "Whoever will report us?"
When they heard of the transfer of *Strongylus contortus*.

Who indexed Haemonchus?
I, said Doctor Hassall.
After a fearful wrasse,
I catalogued Haemonchus.

Cho.: The parasites and commensals
Said "Whoever will report us?"
When they heard of the index of *Haemonchus contortus*.

Who killed Haemonchus?
I, said Doctor Ransom.
I did him up quite handsome,
I killed Haemonchus.

Cho.: The parasites and commensals
Said "Whoever will support us?"
When they heard of the death of *Haemonchus contortus*.

Who caught his blood?
I, said Doctor Schwartz.
I tested it in quarts
For amboceptors.

Who made his shroud?
I, said Doctor Curtice.
I know just where that shirt is,
I made his shroud.

Cho.

HART GOES TO UNIVERSITY OF PENNSYLVANIA

EXTENSION work among veterinarians and livestock owners in Pennsylvania is about to be inaugurated by the University of Pennsylvania. Dr. George H. Hart, for several years past with the Veterinary Division of the University of California, has been appointed to conduct the work and will take up the duties of his new position November 1.

Dr. Hart is a native of Pennsylvania and is a graduate of the School of Veterinary Medicine at the University of Pennsylvania, class of 1903. He was born and raised on a farm near Philadelphia and immediately after graduation practiced in and about that city. Entering the service of the United States Bureau of Animal Industry as a veterinary inspector, he was detailed to a position in the pathological laboratory, where he did much good work. He resigned this position to go into general practice at Los Angeles, California, where he also filled the position of city dairy inspector, in which office he made an enviable record. For the last three years he has been engaged in veterinary research and extension work for the University of California.

Dr. Hart is well qualified by thorough training and broad experience for his new position, in which he will be called on to discuss veterinary subjects with veterinarians and also to inform the livestock owners how the veterinarians can help them and how they can best coöperate with the veterinarians to obtain the best results in reducing the losses from disease. The veterinary extension work will bear the same relation to the practicing veterinarian as the agricultural extension work does to the farmer and livestock man, and in addition it will also take up with farmers and livestock men those problems which can best be presented by a veterinarian.

SALARIES OF FRENCH GOVERNMENT VETERINARIANS

THE French Government has fixed the following scale of salaries in its official veterinary services. We understand this to represent an increase over salaries previously paid. In normal times 5 francs are equal to about \$1.

For the personnel of veterinary schools: Inspector general (three grades), 16,000 to 20,000 francs; director-professors (three grades), 14,000 to 18,000 francs; professors (four grades), 12,000 to 15,000 francs; other members of the faculty, 6,000 to 11,000 francs; various minor employees, 3,800 to 7,000 francs.

For the personnel of laboratories for research in animal diseases: Director (two grades), 14,000 to 16,000 francs; heads of departments (six grades), 6,000 to 11,000 francs; laboratory assistants (eight grades), 3,800 to 5,200 francs.

For frontier veterinary inspectors who give their whole time to government work and are not permitted to engage in private practice: Chief inspectors (two grades), 12,000 to 13,000 francs; assistant chief and other inspectors (six grades), 6,000 to 11,000 francs.

Veterinarians at breeding establishments: Chief veterinarian, 8,000 francs; others (three grades), 4,500 to 6,500 francs.

RATIO OF SIRES AND DAMS

Developments in the "Better Sires—Better Stock" campaign have resulted in figures showing the relative number of males and females kept for breeding purposes. Following are the ratios based on more than 200,000 head of stock of all kinds listed with the United States Department of Agriculture: Cattle, 1 bull to 18.9 cows; horses, 1 stallion to 16.9 mares; swine, 1 boar to 11.5 sows; sheep, 1 ram to 37 ewes; goats, 1 buck to 26.6 does; poultry, 1 rooster to 23.3 hens. Other poultry, geese, ducks, turkeys, etc. (average), 1 male to 8.5 females.

These figures represent conditions on more than 2,000 farms in various parts of the country and are believed to be typical of other farms. They show the importance of placing stress on quality in sires, since in practically all cases a sire is the parent of a very much larger number of offspring than the average female animal.

